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ABSTRACT

The great changes in social security laws which have taken place in the United States since World War II and the likelihood that others will take place in the future make it important to understand what effects these changes have on the rest of the economy. This study, adapted from the author's 1967 dissertation at the University of Michigan, focuses on the macroeconomic aspects of both Old Age, Survivors, Disability, and Health Insurance and State Unemployment Insurance. Its purpose is to assess how changes in contribution rates, the taxable maximum per employee, and the level of benefits affect the level and stability of aggregate demand. It was found that changes in contribution rates exert a sizeable effect on real GNP and prices, and that social insurance lends considerable stability to demand in the economy. (BC)

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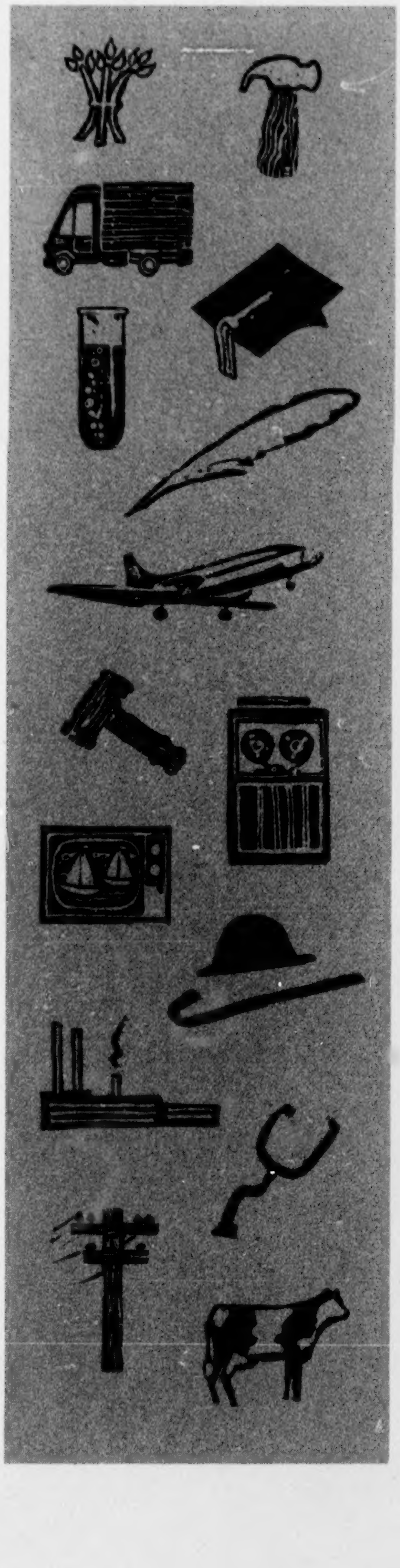

Macroeconomic Effects of Social Insurance on Aggregate Demand

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Social Security Administration
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Staff Paper No. 2

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MACROECONOMIC EFFECTS OF SOCIAL INSURANCE ON AGGREGATE DEMAND

By Wayne G. Vroman

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& WELFARE
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NOTE

The great changes in social security laws which have taken place in the United States since World War II and the likelihood of others to take place in the future make it important to understand what effects these changes have on the rest of the economy. This study, adapted from the author's 1967 dissertation at the University of Michigan, focuses on the macroeconomic aspects of both OASDHI and State Unemployment Insurance. Its purpose is to assess how changes in contribution rates, the taxable maximum per employee, and the level of benefits affect the level and stability of aggregate demand. While the conclusions are the author's own, the findings have significance both for Social Security Administration research and for other students of social insurance. We are pleased to present the study as an ORS Staff Paper. Similar studies employing this technique of analysis give promise of increasing further our knowledge on how social insurance influences the economy. The author, for example, is currently working on a study of how OASDHI affects retirement decisions of older workers.

Mr. Vroman, who is on the staff of the Economic and Long-Range Studies Division, acknowledges the help of many people in the completion of his study. He specifically wishes to acknowledge the assistance of Daniel B. Suits, the chairman of his dissertation committee, and the other members, Locke Anderson, Phil Booth, and Robin Barlow.

Ida C. Merriam
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July 1969

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CHAPTER I

INTRODUCTION AND CONCLUSIONS

Social insurance programs have been growing and will continue to grow in importance in the U. S. economy. Contributions for social insurance, for example, rose from 2.4 percent of GNP in 1947 to 4.3 percent in 1965. Over the same period the percentage of the population sixty-five and older drawing benefits under Old-Age, Survivors, Disability, and Health Insurance (OASDHI) rose from 6.4 to 52.2. Large changes such as these are interesting in themselves. They indicate that our society is increasingly relying on government programs to provide economic security. The program which best illustrates this trend is OASDHI. Originally it was designed to provide retirement and survivor benefits for most employees in the nonagricultural, private sector of the economy. Since 1950 there have been a number of major changes in the program which have broadened its coverage in many ways. Not only were more persons (agricultural and state and local government employees and the self-employed) brought under coverage but also the scope of the program was broadened to give protection against other threats to economic security. Disabled persons were covered by the program starting in 1957, and in 1965 provisions to cover the hospital and medical costs of the aged were enacted. Although the expansion in the scope and coverage of OASDHI and, more generally, of social insurance in the U. S. economy is striking and important, we will not study this expansion _per_

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se but rather some of its effects on the rest of the economy.[1]

Our objective in this dissertation is to study some of the macroeconomic effects of social insurance. Changes in programs such as OASDHI have effects on aggregate demand, costs and prices, and the labor supply of older workers. We will estimate the size of these effects. In Chapters II and III we examine how social insurance affects aggregate demand. Chapter II first describes the way the programs are financed and, then, the links between this financing and the rest of the economy. Next, in Chapter III we employ the University of Michigan Econometric Model of the U.S. Economy to estimate how much social insurance affects the level and stability of aggregate demand in the economy.

We find: (1) Changes in social insurance contributions and transfer payments of the size of the 1965 Amendments to the Social Security Act exert a sizeable effect on real GNP and prices. We estimate that provisions of the 1965 act raised real GNP by $2.7 billion in 1965 but lowered it by $3.6 billion in 1966. (2) Social insurance, especially the transfer payments of State Unemployment Insurance, lends considerable stability to demand in the economy. We estimate that the presence of social insurance in the economy reduces the impact, or one year, multiplier of government expenditures on real GNP from 2.50 to 2.02.

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[1] A good discussion of the major aspects of social insurance programs, particularly OASDHI, and how the programs interrelate can be found in: Robert J. Myers, Social Insurance and Allied Government Programs (Homewood, Illinois: Richard D. Irwin, Inc., 1965).

CHAPTER II

SOCIAL INSURANCE IN THE U. S. ECONOMY

The purpose of this chapter is twofold: (1) to describe the social insurance sector of the U. S. economy, and (2) to show how social insurance relates to the rest of the economy. In this second part we will demonstrate how social insurance contributions and transfer payments are related to the level and composition of consumer demands, costs of production, and prices.

A. The Social Insurance Sector of the Economy

There are in the U. S. economy a number of social insurance programs. They have been instituted to protect defined groups of workers and, in some instances, their dependents as well, from the threats to economic security posed by disabling accidents, unemployment, and old age. The most important of these programs are Old-Age, Survivors, Disability and Health Insurance (OASDHI), State Unemployment Insurance (State UI), the Federal Employee Retirement systems, the Railroad Retirement system, and retirement systems for State and local government employees. These programs all operate in roughly the same way. Persons become eligible for benefits after employment under the program for a prescribed minimum period of time. While in employment the employer, as well as the employee, is required to make contributions based on current earnings to a specified trust fund. When a worker becomes eligible to receive benefit payments from the program, the payments are made from the trust fund. Under each program covered employees and employers are required to make contributions which are the ultimate source of the transfer payments received by the beneficiaries of the programs. A large number pay small amounts to insure themselves against a complete loss of income at some future time because of disability, unemployment, or old-age.

The annual change in the trust fund of a social insurance program can be summarized in the following way:

$$TF = TF_{-1} + SI_r + SI_e + IY - X - Z \qquad \text{(II-1)}$$

where

TF = the size of the program's trust fund at the end of the year
SI_r = employer contributions
SI_e = employee contributions
IY = interest income from the financial assets of the trust fund
X = transfer payments to beneficiaries of the program
Z = administrative expenses

The size of the trust fund at a given time is the amount of assets currently available to cover future benefit payments and administrative expenses. It represents the net amount by which inpayments (contributions plus interest income) have exceeded outpayments (transfers to beneficiaries plus administrative expenses) since the program was founded. The trust fund will grow in any year when inpayments exceed outpayments.

We will now examine in more detail the financial operations of two social insurance programs, OASDHI and State UI.

1. OASDHI

Equation (II-2) summarizes the trust fund activities of the entire OASDHI system.

$$\text{(II-2)} \qquad TF^{OA} = TF^{OA}_{-1} + SI^{OA}_{rp} + SI^{OA}_{ro} + SI^{OA}_{e} + SI^{OA}_{se} + IY^{OA} - X^{OA} - Z^{OA} - FI^{1}$$

where

TF^{OA} = the size at the end of the year of all trust funds associated with OASDHI. Before 1956 this is the old-age and survivors insurance trust fund. For years since 1956 the disability insurance trust fund is added. The hospital insurance trust fund would be added for all years after 1965.

SI^{OA}_{rp} = private employer contributions for OASDHI.

SI^{OA}_{ro} = State and local government and armed forces contributions for OASDHI.

SI^{OA}_{e} = contributions by employees of private employers, State and local government employees, and armed forces personnel.

SI^{OA}_{se} = contributions by self-employed persons.

X^{OA} = total OASDHI transfer payments.

Z^{OA} = administrative expenses.

FI = financial interchange with the Railroad Retirement account.

Table II-1 shows each of the elements in (II-2) for the years 1950 through 1965. Employer contributions are separated into two

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[1] All symbols used in this chapter appear in Appendix A along with definitions.

categories because the responses of private employers to the necessity to make contributions are probably much different from those of State and local governments and the armed forces.

The financial interchange is a special transaction that was first instituted after railroad employees were brought under OASDHI coverage in 1957. Its purpose is to place the OASDHI trust funds "in the same financial position they would have held if there had never been a separate Railroad Retirement program."[2] From Table II-1, columns 7, 9 and 10, we can see that year to year changes in interest income (IY^{OA}), administrative expenses (Z^{OA}) and the financial interchange (FI) are small, being no more than $.2 billion between any two consecutive years. Changes in transfer payments and contributions account for nearly all of the annual changes in the size of the combined OASDHI trust fund.

(a) OASDHI Transfer Payments

Annual transfer payments from the OASDHI trust fund depend on both the number of beneficiaries and the size of average monthly benefits. This can be stated as:

$$X^{OA} = 12 \cdot AMB^{OA} \cdot O^{OA} \qquad \text{(II-3)}$$

where

X^{OA} = annual OASDHI transfer payments.

AMB^{OA} = average monthly benefits of OASDHI beneficiaries.

O^{OA} = the number of monthly OASDHI beneficiaries.

The observed increase in OASDHI benefits from 1.0 billion in 1950 to 18.1 billion in 1965 (see column 8 of Table II-1) was due to large increases

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[2] Robert J. Myers, Social Insurance and Allied Government Programs (Homewood, Illinois: Richard D. Irwin, Inc., 1965), p. 75.

TABLE II-1

OASDHI TRUST FUND ACTIVITIES, 1950-1965
(All figures are in billions of dollars)

1. Year	2. TF^{OA} End of Year[1]	3. SI_{rp}^{OA} Private Employer Contributions[2]	4. SI_{ro}^{OA} Gov't. Employer Contributions[2]	5. SI_{e}^{OA} Employee Contributions[2]	6. SI_{se}^{OA} Self-Employed Contributions[2]	7. IY^{OA} Interest Income[1]	8 X^{OA} Transfer Payments[2]	9 Z^{OA} Administrative Expenses[1]	10. FI Financial Interchange[1]
1950	13.7	1.3	.0	1.3		.3	1.0	.1	
1951	15.5	1.6	.1	1.7		.4	1.9	.1	
1952	17.4	1.7	.1	1.8	.2	.4	2.2	.1	
1953	18.7	1.8	.1	1.9	.2	.4	3.0	.1	
1954	20.6	2.4	.1	2.5	.2	.4	3.6	.1	
1955	21.7	2.7	.1	2.8	.3	.5	4.9	.1	
1956	22.5	2.8	.2	3.0	.5	.5	5.7	.1	
1957	23.0	3.2	.5	3.7	.5	.6	7.3	.2	
1958	23.2	3.2	.5	3.7	.6	.6	8.5	.2	.1
1959	22.0	4.1	.5	4.6	.6	.6	10.2	.2	.3
1960	22.6	5.0	.6	5.6	.7	.6	11.1	.2	.3
1961	22.2	5.0	.7	5.7	.8	.6	12.6	.3	.3
1962	20.7	5.5	.7	6.2	.8	.6	14.3	.3	.4
1963	20.7	6.6	.9	7.5	.9	.6	15.2	.3	.4
1964	21.2	6.9	.9	7.8	1.0	.6	16.0	.4	.4
1965	19.8	7.1	1.1	8.2	1.0	.7	18.1	.4	.4

[1] Source: U. S. Social Security Administration, Social Security Bulletin, Annual Statistical Supplement, 1965 (Washington: U. S. Government Printing Office, 1967), Table 12.

[2] Source: U. S. Department of Commerce, The National Income and Product Accounts of the United States, 1929-1965 Statistical Tables (Washington: U. S. Government Printing Office, 1967), Tables 3.5, 3.6, and 3.7. Private Employer Contributions is line 6 in Table 3.7 less lines 5, 6, 7 and 8 of Table 3.8. Other employer contributions is line 4 of Table 3.8 less Private Employer Contributions.

in the scope of the program which resulted in large increases in both the size of average monthly benefits and the number of monthly beneficiaries. During these 16 years average monthly benefits increased from $26.39 to $74.34, while the number of monthly beneficiaries increased from 3.01 to 20.25 million persons. (Appendix B-1 shows both of these for the 1950-1965 period.) Average benefits rose rapidly in years like 1951, 1953, 1955, 1959, and 1965 when amendments to the Social Security Act increased the size of basic benefits. The number of beneficiaries grew at even a faster rate in this period, partly because the population of older people was steadily growing, and partly because legislative amendments eased eligibility requirements, lowered the retirement age, extended coverage to more workers, and brought disabled persons under coverage. The increase was from 3 million persons in 1950 to 20 million in 1965.

(b) Employer and Employee Contributions to OASDHI

Employer and employee contributions (SI_{rp}^{OA}, SI_{ro}^{OA}, and SI_{e}^{OA} in (II-2)) can be explained by relationships of the following form

(II-4) $SI^{OA} = \alpha\beta\gamma W$

where

α = the OASDHI contribution rate

β = the ratio of taxable wages and salaries to covered wages and salaries, i. e., taxable plus nontaxable wages and salaries of employees covered by OASDHI.

γ = the ratio of covered wages and salaries to all wages and salaries. Employers and employees are required to make identical contributions. In Appendix B, Table B-1, we show α, β, and γ for the private, non-farm sector of the economy for each of the years 1950-1965.

α and γ change when legislation raises contribution rates and increases OASDHI coverage among the labor force. The contribution rate was increased a number of times, rising from 1-1/2 percent in 1950 to 3-5/8 percent in 1965. γ in the private non-farm sector of the economy also increased, but not greatly, because already in 1950 about 90 percent of wages and salaries were covered by OASDHI. In recent years it has stabilized at about 96 percent of all private, non-farm wages and salaries.

β changes not only with legislation, which periodically has raised the maximum taxable wages per covered employee, but also as a result of the growth in covered wages and salaries. The definition of β is

$$\text{(II-5)} \qquad \beta = \frac{W^{OA}_{TX}}{W^{OA}_{C}}$$

where

W^{OA}_{TX} = wages and salaries taxable under OASDHI

W^{OA}_{C} = wages and salaries covered by OASDHI

Dividing the numerator and the denominator of (II-5) by covered employment yields a second way of expressing β, namely

$$\text{(II-6)} \qquad \beta = W^{OA}_{TX}/E^{OA}_{C} \Big/ W^{OA}_{C}/E^{OA}_{C} = \frac{\overline{W}^{OA}_{TX}}{\overline{W}^{OA}_{C}}$$

where $\overline{W}_{TX}$ and $\overline{W}_{C}$ are average taxable wages and average covered wages respectively. Since it is a ratio, the percentage change in β from one year to the next is equal to the percentage change in taxable wages less the percentage change in covered wages, or

$$(\text{II-7}) \qquad \frac{\Delta\beta}{\beta_{-1}} \approx \frac{\Delta\bar{W}_C^{OA}}{\bar{W}_{TX_{-1}}^{OA}} - \frac{\Delta\bar{W}_C^{OA}}{\bar{W}_{C_{-1}}^{OA}} .$$

We can see from (II-7) that in order to explain year to year changes in β we have to explain changes in average covered wages and in average taxable wages.

Average covered wages continuously rise from one year to the next but the amount of the increase depends upon changes in the state of aggregate demand. The long-run increase in average wages is basically due to the growth of productivity in the economy. When the economy goes into a recession, however, this temporarily reduces the growth in average wages below the trend rate of increase. Conversely, when the economy moves back towards full employment, average wages increase more rapidly than their long-run trend.

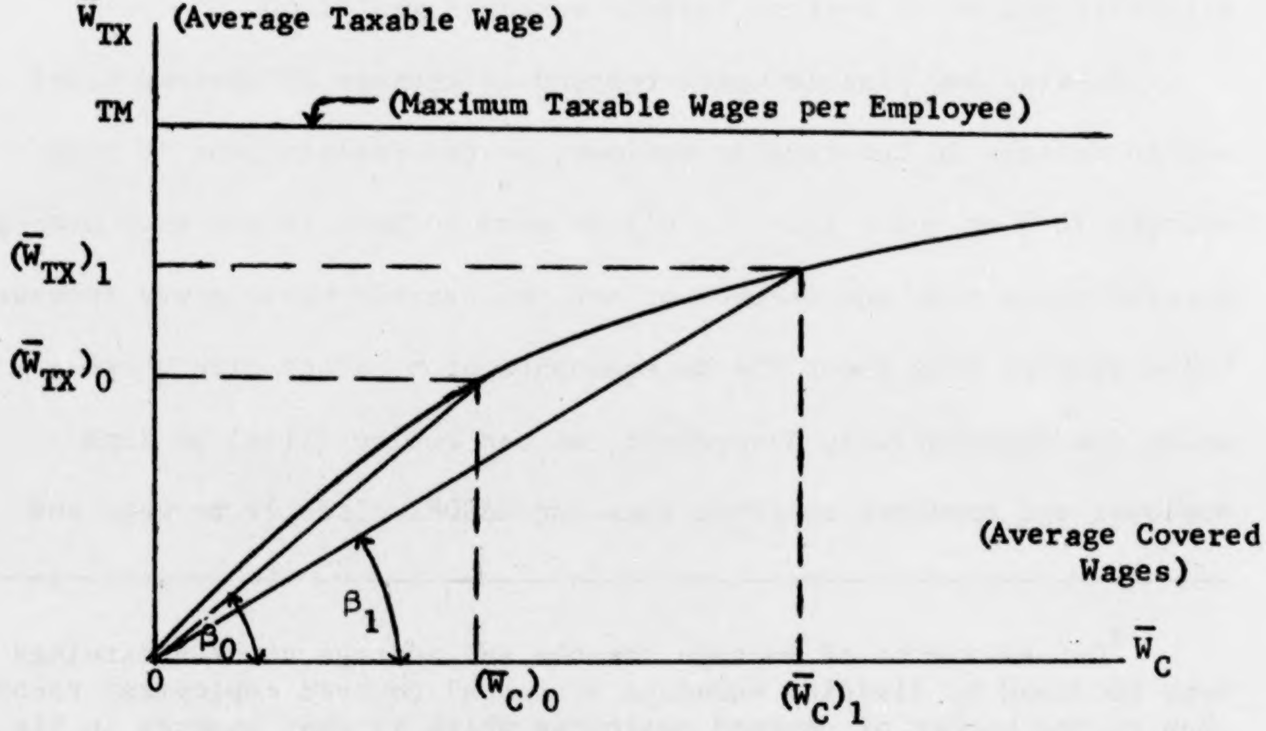
Yearly increases in taxable wages depend upon two factors: changes in covered wages, and changes in the maximum taxable wages per employee. The taxable maximum was increased three different times between 1950 and 1965, and then again in 1966 to a level of \$6600 per person. Each time this maximum is increased it causes β to increase. Recent work by Michael Resnick of the Social Security Administration gives estimates of the percent of covered earnings taxable under different taxable maximums for the years 1950-1964.[3] We will use this source to estimate how much taxable wages rise when the taxable maximum is raised.

---

[3] Michael Resnick, "Annual Earnings and Taxable Maximum Under OASDHI," *Social Security Bulletin*, XXIX, (November, 1966), p. 39. Resnick's data covers all earnings, self-employed earnings as well as wages and salaries. Since the bulk of covered earnings are wages and salaries, about 90 percent of the total in 1965, his calculations show primarily the percent of wages and salaries taxable under the different taxable maximums.

Taxable wages also increase when covered wages increase. Because there is an upper limit to taxable wages, however, taxable wages do not rise as rapidly as covered wages. Furthermore, as covered wages continue to rise by equal amounts, smaller and smaller fractions of each successive increase are taxable as increasingly more of the increases go to persons whose earnings are already above the taxable maximum. Figure II-1 depicts the relationship between average taxable wages, average covered wages, and the taxable maximum. When average covered wages rise from $(\bar{W}_C)_0$ to $(\bar{W}_C)_1$ average taxable wages also rise (from $(\bar{W}_{TX})_0$ to $(\bar{W}_{TX})_1$), but by a smaller amount. Thus, β_1 in Figure II-1 is smaller than β_0. We can also see from Figure II-1 that as average covered wages continue to increase by equal amounts the successive increases in average taxable wages become smaller. We can approximate

Figure II-1. Average Wages and Average Taxable Wages.



this nonlinear response in the following way

(II-8) $$\Delta\overline{W}^{OA}_{TX} = \lambda(TM - \overline{W}^{OA}_{TX})_{-1}\ \Delta\overline{W}^{OA}_{C}$$

where

TM = the taxable maximum.

The relationship represented in (II-8) is nonlinear and the response of average taxable wages to increases in average covered wages approaches zero as average taxable wages approach the taxable maximum. λ in (II-8) can be estimated from the Resnick article. For example with a $4800 taxable maximum we found the following relation over the 1956-1964 period.[4]

(II-9) $$\Delta\overline{W}^{OA}_{TX} = -.0125 + \underset{(.032)}{.370}(4.8 - \overline{W}^{OA}_{TX})_{-1}\Delta\overline{W}^{OA}_{C}$$

$$\overline{R}^2 = .942$$

$$\hat{\sigma}_U = .0074$$

This regression yielded a very close fit. The standard error of the estimated change in average taxable earnings was $7.40.

Knowing how taxable wages respond to changes in covered wages and to changes in the taxable maximum, we can explain year to year changes in β by using (II-7). All we need to know is how much average covered wages rose and whether or not the taxable maximum was increased. Using what we know about the determinants of β, along with α and γ which are legislatively determined, we can employ (II-4) to link employer and employee contributions for OASDHI directly to wage and salary payments.

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[4] Our estimates of average taxable and average covered earnings were obtained by dividing earnings by annual covered employment rather than by the number of covered employees which is what appears in his tables.

Between 1950 and 1965 employer and employee contributions for OASDHI grew very rapidly. Adding together columns 3, 4 and 5 of Table II-1, we note that they increased from $2.6 billion in 1950 to $16.4 billion in 1965. We can employ (II-4) to specify four causes of such a large increase in contributions: (i) α - the contribution rate for both workers and employers - increased from 1-1/2 percent in 1950 to 3-5/8 percent in 1965; (ii) β - the ratio of taxable to covered wages and salaries - did not decrease greatly in this period despite a large rise in average covered wages and salaries. This is because the taxable maximum was increased by $600 in 1951, 1955 and 1959. Thus, although β declined, the decrease in the private, non-farm sector was only from .797 to .742; (iii) γ - the ratio of covered to total wages and salaries - increased by a small amount in the private sector during the period rising from .903 in 1950 to .958 in 1965. In the government sector of the economy, however, coverage expanded markedly. No government employees were covered by OASDHI in 1950. By 1965 about 1/8 of all OASDHI contributions were based on wages earned by State and local government employees and armed forces personnel. Since employment by State and local governments has been growing particularly rapidly, contributions from this source will become increasingly large relative to total contributions. This can be seen clearly by comparing columns 3 and 4 in Table II-1. (iv) W - wages and salaries - the base upon which employer and employee contributions rest rose rapidly in both the private and government sectors between 1950 and 1965. For example, Appendix B, Table B-1, shows that private, non-farm wages and salaries grew from 121.62 billion to 286.45 billion during this 16 year period. All four of the factors in (II-4) were important determinants of the large observed increase in OASDHI contributions by employers and employees.

(c) Self-Employed Contributions for OASDHI

Self-employed persons were first covered by OASDHI in 1951. Persons covered by OASDHI were permitted to make their contributions in April of the year following the accrual of their tax liability. Consequently, self-employed contributions (column 6 of Table II-1) were first made in 1952. The observed contributions for each year are based on the previous year's taxable net income of covered self-employed persons.

Except for the lag between accrual and actual payment, self-employed contributions for OASDHI are determined in the same manner as contributions by employers and employees. The exact relation is

$$SI_{se}^{OA} = \alpha'\beta'\gamma' \quad PY \tag{II-10}$$

α' = the contribution rate for self-employed persons

β' = the ratio of taxable to total net income of self-employed persons covered by OASDHI

γ' = the ratio net income covered by OASDHI to total net income of self-employed persons

PY = net income of self-employed persons (proprietor's income)

The contribution rate (α') and the ratio of covered to total proprietor's income (γ') are set by OASDHI legislation. The ratio of taxable to covered proprietor's income (β') depends both upon legislation which determines the size of the taxable maximum, and the average net income of the self-employed. α', β' and γ' for the non-farm sector of the economy are shown in Appendix B for the years 1950-1965.

In periods when the taxable maximum is held constant there is a non-linear relation between taxable and covered proprietors' income similar to the one for wage and salary income depicted in Figure II-1. Because the taxable maximum poses an upper limit to average taxable net income, the latter increases by smaller and smaller amounts for equal successive increases in the net income of self-employed persons. For non-farm self-employed persons the following relation was observed over the years 1960-1965:

$$\text{(II-11)} \qquad \Delta\overline{py}_{TX} = -.0132 + \underset{(.049)}{.202}\,[4.8 - \overline{py}_{TX}]_{-1}\,\Delta\overline{py}_{c}$$

$$R^2 = .767$$

$$\hat{\sigma}_U = .0349$$

where

$\overline{py}_{TX}$ = average taxable net income of non-farm self-employed persons covered by OASDHI

$\overline{py}_{c}$ = average net income of non-farm self-employed persons covered by OASDHI

The slope coefficient in (II-11) is much smaller than in (II-9), .202 compared to .370. This is reasonable since the income distribution of self-employed persons is less equal than that of wage and salary workers. Hence, for self-employed persons more of the increments to income go to people already earning above the taxable maximum.

A second contrast between (II-9) and (II-11) is that there is much more unexplained variation in the changes in taxable proprietors' income. The standard error of estimate is $34.90 in this case compared to $7.40

for the estimated changes in average taxable earnings. While there are these two contrasts, the relationship between taxable income and covered income is basically the same for self-employed persons as it is for wage and salary workers.

(d) The Overall Size of OASDHI Trust Funds

Having examined the different components of (II-2) it is useful to make one observation about the recent overall behavior of the combined OASDHI trust fund. Although both contributions and transfer payments grew rapidly between 1950 and 1965, the overall size of the combined OASDHI trust fund did not change much after 1954 (see column 2 of Table II-1). It remained at a level of about $20 billion. This means that benefit payments in any year are essentially being financed by contributions made in the same year. It also means that when the size of benefit payments was enlarged, as in 1955 and 1959, there was a matching increase in contributions. Increasing both contributions and transfers alters the distribution of income in the economy from those currently at work to people who are for the most part out of the labor force. Such a redistribution could have effects on the level and composition of aggregate demand if the spending patterns of those being taxed differ from those receiving transfer payments. We will later (Chapter III section B-1) assess the size of these effects.

2. State Unemployment Insurance

The financial operations of the State Unemployment Insurance trust fund are summarized as follows:

(II-12) $$TF^{UI} = TF^{UI}_{-1} + SI^{UI}_{r} + IY^{UI} - X^{UI}$$

where

TF^{UI} = the size of the State UI trust funds at the end of the year.

SI_r^{UI} = employer contributions for State UI.

IY^{UI} = interest income of the State UI trust fund.

X^{UI} = State UI transfer payments.

The size of the trust fund is determined both by inpayments (employer contributions plus interest income) and outpayments (transfers to State UI beneficiaries). The trust fund will grow in those years when inpayments exceed outpayments. Comparing (II-12) with (II-2) reveals two differences between the financial operations of State UI and OASDHI. i) Contributions for State UI are made only by employers, not by employers and employees.[5] ii) Administrative expenses of the State UI **system** are not met by withdrawals from the trust fund. Instead, they are financed by a special tax, the Federal Unemployment Tax. Table II-2 shows each of the elements in (II-12) for the years 1950-1965. Federal Unemployment Tax payments are also included in the table to give an idea of the size of administrative expenses of the State UI system.[6] From Table II-2 we see that interest income was almost constant during the 1950-1965 period. It remained at .2 billion for all years

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[5] Only three states, Alabama, Alaska, and New Jersey require employee contributions.

[6] In 1962 and 1963, however, part of Federal Unemployment Tax collections were used to finance a special State UI program. (See Chapter III, section B.3). Collections for these two years, then, are much larger than administrative expenses.

TABLE II-2

STATE UNEMPLOYMENT INSURANCE TRUST FUND ACTIVITIES, 1950-1965
(All figures in billions of dollars)

1. Year	2. TF^{UI} Trust Fund End of Year[1]	3. SI_r^{UI} Employer Contributions[1]	4. IY^{UI} Interest Income	5. X^{UI} Transfer Payments	6. SI_r^{FUT} Federal Unemployment Tax[2]
1950	7.0	1.2	.1	1.4	.2
1951	7.8	1.5	.2	.8	.3
1952	8.3	1.4	.2	1.0	.3
1953	8.9	1.3	.2	1.0	.3
1954	8.2	1.1	.2	2.0	.3
1955	8.3	1.2	.2	1.4	.3
1956	8.6	1.5	.2	1.4	.3
1957	8.7	1.5	.2	1.7	.3
1958	7.0	1.5	.2	3.5	.3
1959	6.9	2.0	.2	2.3	.3
1960	6.6	2.3	.2	2.7	.4
1961	5.8	2.4	.2	3.4	.5
1962	6.3	3.0	.2	2.7	1.0
1963	6.6	3.0	.2	2.8	.8
1964	7.3	3.0	.2	2.5	.5
1965	8.4	3.1	.3	2.2	.6

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[1] Source: U. S. Bureau of Employment Security, Handbook of Unemployment Insurance Financial Data 1946-1963, (Washington: U.S. Government Printing Office, 1966), pp. 1-120; and, U. S. Bureau of Employment Security, Unemployment Insurance Review, III, (March, 1966), p. 23.

[2] Source: U. S. Department of Commerce, The National Income and Product Accounts of the United States, 1929-1965 Statistical Tables, op. cit. Table 3.8

except 1950 and 1965. Consequently, year to year changes in the State UI trust fund come almost entirely from changes in transfer and employer contributions. From columns 3 and 5 of Table II-2 we can see that both of these vary from year to year with benefits being the more variable of the two. To understand year to year changes in the size of the trust fund we need to understand why transfers and contributions change.

(a) State UI Transfer Payments

Transfer payments from the State UI system depend on the average size of weekly benefit checks and the average number of unemployed workers receiving benefits. We can state this as follows:

$$X^{UI} = 52 \cdot AWB \cdot U_B \qquad \text{(II-13)}$$

where

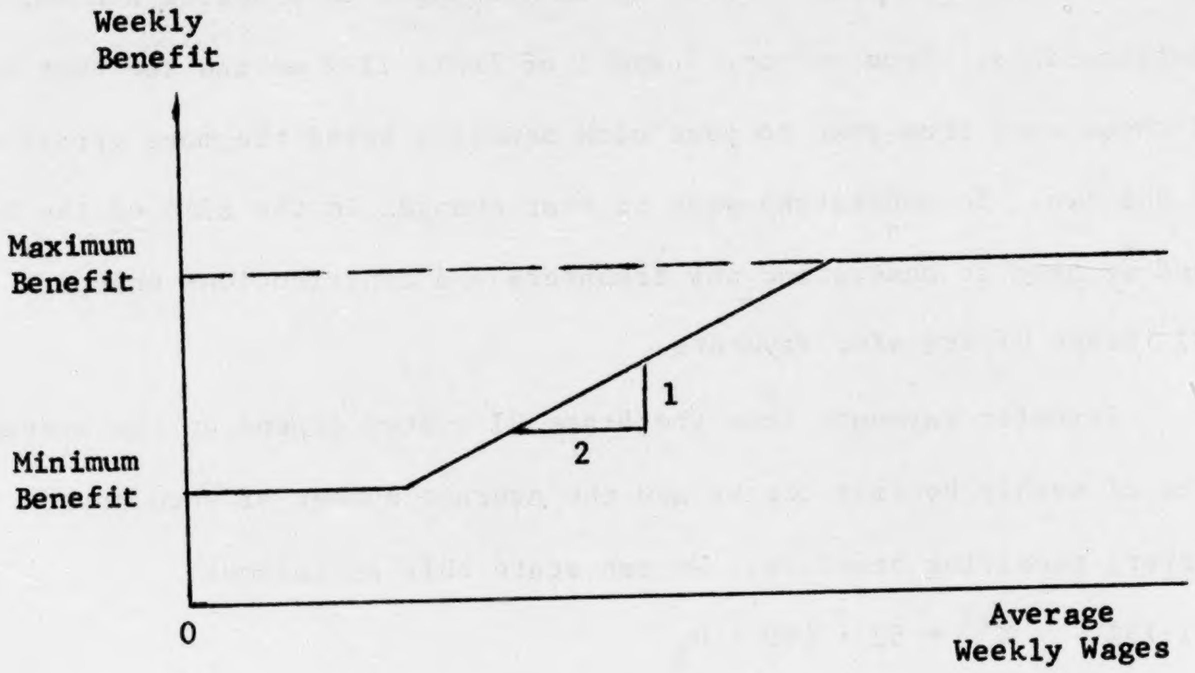
AWB = average weekly State UI benefits

U_B = the average weekly number of beneficiaries.

The 52 converts the flow of benefits from a weekly to an annual rate.

Average weekly benefits show a strong tendency to increase from one year to the next (see Appendix B, Table B-3). Although benefit formulas in the various states are not uniform, they are roughly similar. The size of an unemployed worker's weekly benefit depends on his average weekly wages in some earlier period, or "base" period, which terminated shortly prior to his separation from work. In most states benefits are half the size of average weekly wages but subject to a minimum and a maximum limit. The resulting relationship between base period weekly wages and the weekly benefit is shown in Figure II-2. In the range between the minimum and the maximum, benefits rise by one dollar for each two dollar increase in the base period average weekly wages.

Figure II-2 Weekly State UI Benefits and Average Weekly Wages



Year to year increases in average weekly benefits are explained by two factors, increases in average weekly wages and upward revisions in statutory minimum and maximum weekly benefits. A result of upward revisions in minimum and, more important, in maximum benefits has been that average weekly benefits remained nearly constant relative to average weekly wages in the 1950-1965 period. Between 1950 and 1965 the average weekly earnings of production workers in manufacturing rose from $58.32 to $107.43 while average weekly unemployment benefits increased from $20.76 to $37.19. In relative terms benefits declined slightly from 35.6 to 34.6 percent of average weekly earnings. Although weekly benefits have been increasing at about the same rate as weekly wages, it is important to note that over the entire 1950-1965 period ceilings on maximum benefits have had the effect of keeping average benefits considerably less than half of average weekly wages.

The average number of weekly unemployment insurance beneficiaries is considerably less than the number of unemployed persons in the economy. For example, between 1956 and 1965 unemployment in the U.S. economy averaged 3.771 million persons while the number of unemployment insurance beneficiaries averaged 1.514 million or 40.1 percent of total unemployment. There are several reasons why, on the average, the number of State UI beneficiaries is so small relative to total unemployment. i) Certain classes of workers are not covered by State Unemployment Insurance. Among these are workers in agriculture, domestic servants, unpaid family workers, employees of non-profit organizations, nearly all employees of State and local governments and self-employed. Certain other workers such as railroad employees, Federal civilian employees, and veterans are covered by special arrangements. ii) New entrants to the labor force who cannot find jobs are not eligible to receive benefits. They must be employed for some minimum period to acquire benefit rights. iii) Some workers in industries covered by State Unemployment Insurance are not eligible to receive benefits. This can be because their firm is too small (in many states firms with fewer than four employees or in operation less than twenty weeks per year). The unemployed worker may not have worked long enough, in terms of the number of weeks or some minimum level of total earnings, during the appropriate reference period prior to his layoff to be eligible for benefits. Also, workers who become unemployed for "non-economic" reasons such as being on strike or quitting are usually disqualified from receiving benefits. iv) Newly employed persons who file for benefits must wait for a specified period before they can begin to receive benefits. This "waiting period" is frequently one week.

v) Unemployed workers cannot draw benefits for more than some maximum period of time (twenty-six weeks in most states). After drawing benefits for this maximum period a worker is said to "exhaust" his benefit rights even though he is still unemployed.

Although the number of beneficiaries of State Unemployment Insurance have recently averaged about 40 percent of total unemployment, the marginal response of beneficiaries to changes in unemployment is quite large. For the period 1955-1966 the following relationship was found,

(II-14) $$\Delta U_B = \underset{(.046)}{.604}\,\Delta U - \underset{(.058)}{.070}\Delta^2 CLF - .0024$$

$$\bar{R}^2 = .939$$

$$\hat{\sigma}_U = .114$$

where

U = unemployment

CLF = the civilian labor force

This relationship indicates that on the average when unemployment rises by one million persons, the number of beneficiaries will increase by about .6 million. The second explanatory factor in the question is the current change less the lagged change in the civilian labor force. It is included to take account of changes in unemployment due to entrance into the labor force of inexperienced workers. When the labor force is growing rapidly, new entrants who cannot find jobs will increase the number of unemployed but none of this group will be eligible for benefits. The coefficient on $\Delta^2 CLF$ is quite reasonable. It implies an average unemployment rate of 11.6% ($\frac{.070}{.604}$) for new entrants to the labor force. Since the unemployment rate for teenagers who account for most of the growth in the labor force averaged 13.1 percent from 1955 to 1966, the coefficient on $\Delta^2 CLF$ seems to be of the right order of magnitude. The overall fit in (II-14) is quite close. The standard error of estimate is .114 million beneficiaries.

(b) Employer Contributions for State UI

Employer contributions for State UI are described by the following relation:

$$SI_r^{UI} = \alpha''\beta''\gamma''W \qquad \text{(II-15)}$$

where

α'' = the average contribution rate for employers covered by State UI

β'' = the ratio of taxable to total (taxable plus nontaxable) wages and salaries paid by covered employers

γ'' = the ratio of the wages and salaries paid by covered employers to total wages and salaries in the private, non-farm sector of the economy

α'', β'', and γ'' are shown in Appendix B, Table B-3 for each of the years from 1950 to 1965. Nearly all states use an experience rating system to determine the contribution rate for employers. If small numbers of his former employees are drawing unemployment insurance benefits, the employer's cumulative contributions will exceed cumulative benefits paid to such workers and his account balance in the State UI trust fund will grow. When this account balance exceeds some specified level, e.g., three percent of annual wage and salary payments in recent years, the employer becomes eligible to have his contribution rate reduced. For the economy as a whole, α'', the average employer contribution rate depends on the recent behavior of total unemployment. When unemployment falls, State UI beneficiaries decrease (see (II-14)), employer contributions will tend to exceed unemployment insurance transfers, and the State UI trust fund will grow. Growth in the trust fund means that many employers will become eligible for reduced contribution rates. Conversely, when high unemployment causes the trust fund to become smaller many employers will incur higher contribution rates. Changes in the size of the State UI trust fund and changes in the contribution rate are in fact closely related. For the years 1955-1965 the following relationship was found.

$$\text{(II-16)} \qquad \Delta\alpha'' = .00041 - \underset{(.00024)}{.00219}\Delta TF^{UI}_{-1} - \underset{(.00025)}{.00088}\Delta TF^{UI}_{-2}$$

$$\bar{R}^2 = .893$$

$$\hat{\sigma}_U = .00056$$

From (II-16) we can see that the contribution rate does not fully adjust within one year to changes in the size of the State UI trust fund. When the trust fund increases about 70 percent of the reduction in the contribution rate occurs in the next year and 30 percent in the second year after that. The lag in the full adjustment of the contribution rate reflects a lag between when new contribution rates are determined and when they are actually put into effect. In many states the current year's contribution rate depends on the employer's balance in the trust fund as of June 30 of the previous year. If substantial transfer payments reduce an employer's balance between July and December of 1965 this would affect his tax rate for 1967, not 1966.

The dependence of the contribution rate on the size of the trust fund has important implications for the role of unemployment insurance as an automatic stabilizer. The increase in employer contributions which occur after the onset of a recession must lead to some combination of the following: lower profits, higher prices and/or lower wages. The actual incidence of this tax is an empirical question which has not been determined with certainty.[7] In a period where substantial unemployment persisted for more than one year, the late 1950's and early 1960's, for example, these secondary effects would tend to reduce consumer and business demand thus weakening the stabilizing impact of unemployment insurance transfer payments. We will estimate later how important these secondary effects actually are (Chapter III, section C-4).

β'', the ratio of taxable to total covered wages, changes from year to year as average taxable wages and average covered wages change. It decreased markedly between 1950 and 1965. In Appendix B Table B-3 the time series for β'' shows a decrease from .791 in 1950 to .559 in 1965. β'' has been declining because most states still use the same taxable maximum, $3000 per covered employee, that was in effect in all states in 1950. Since average wages rose from $3136 to $5720 during this period it is easy to see why β'' would decrease sharply in the absence of large increases in the taxable maximum for State UI.

Since it is a ratio, we can express percent changes in β'' as follows:

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[7] John A. Brittain of the Brookings Institution in a comparative analysis of major industrial countries has found evidence of complete backward shifting, but his results for the United States are less conclusive. His results are not yet published.

$$(II\text{-}17) \qquad \frac{\Delta\beta''}{\beta''_{-1}} = \frac{\Delta\bar{W}^{UI}_{TX}}{\bar{W}^{UI}_{TX_{-1}}} - \frac{\Delta\bar{W}^{UI}_{C}}{\bar{W}^{UI}_{C_{-1}}}$$

where

$\bar{W}^{UI}_{TX}$ = average taxable wages and salaries of workers covered by State UI

$\bar{W}^{UI}_{C}$ = average wages and salaries of workers covered by State UI

Changes in β'', then, depend upon changes in average taxable wages ($\bar{W}^{UI}_{TX}$) and changes in average covered wages ($\bar{W}^{UI}_{C}$). The previous discussion of changes in taxable and covered wages and salaries of workers covered by OASDHI (see (II-7), (II-8), (II-9) and the discussion which follows these expressions) holds equally well with respect to State UI. Average covered wages under State UI rise with the long-term growth of productivity in the economy but year to year changes depend upon fluctuations in aggregate demand. The change exceeds the trend in recovery years and falls short of the trend when the economy moves into a recession.

Changes in average taxable wages of persons under State UI depend, in a nonlinear way, on changes in average covered wages and upon the taxable maximum. Although the taxable maximum is still $3000 in most states, by 1966 eighteen had taxable maximums which were higher, ranging from $3300 to $7200. To follow the trend of the average taxable maximum a weighted average of the taxable maximums of the states was constructed. The weights used were each state's relative share of total Personal Income for the U.S. This average taxable maximum ($\overline{TM}$) appears in Appendix B, Table B-3. The relationship between $\bar{W}^{UI}_{TX}$, $\bar{W}^{UI}_{C}$ and $\overline{TM}$ for the years 1954-1965 is shown in Figure II-3. Notice in recent years how close average taxable wages have approached the average taxable maximum. In 1965 the taxable maximum of $3217 was only slightly higher than average taxable wages which were $3197.

To explain year to year changes in average taxable wages, changes in both average covered wages and changes in the average taxable maximum were used in a regression yielding quite satisfactory results for the years 1955-1965.

$$\text{(II-18)} \qquad \Delta \bar{W}^{UI}_{TX} = .0075 + \underset{(.494)}{.990} \left(\overline{TM} - \bar{W}^{UI}_{TX}\right)_{-1} \Delta \bar{W}^{UI}_{C} + \underset{(.085)}{.205} \left(\frac{1}{\beta''_{-1}}\right)^2 \Delta \overline{TM}$$

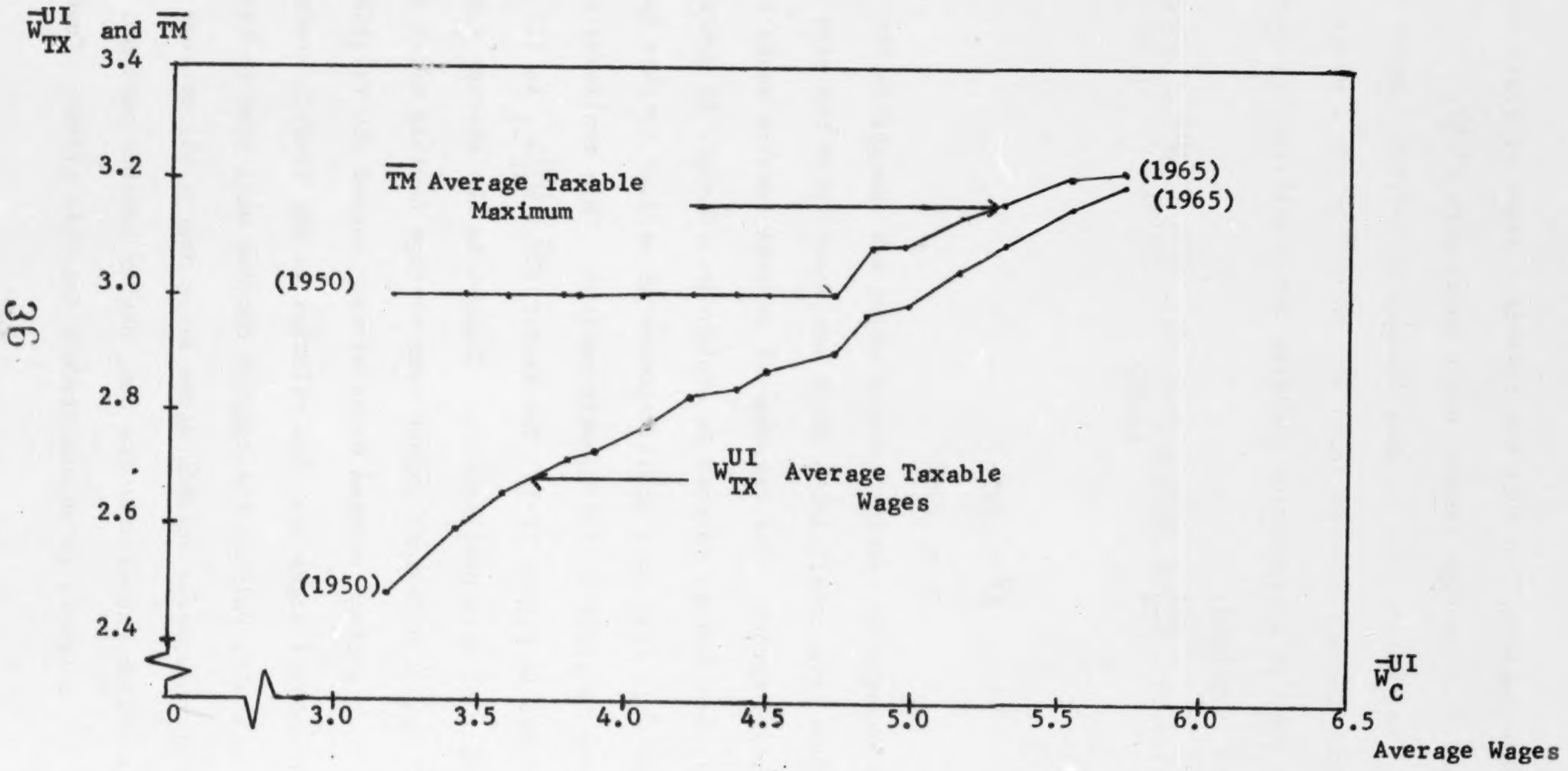
$$\bar{R}^2 = .507$$

$$\hat{\sigma}_U = .0134$$

Both changes in average covered wages and changes in the average taxable maximum have coefficients which are about twice the size of their standard errors. The response of average taxable wages to both of these explanatory factors is nonlinear. Changes in average covered wages will lead to a small increase in average taxable wages when the latter is close to the taxable maximum. This nonlinear response is depicted in Figure II-1. The factor $(\overline{TM} - \bar{W}^{UI}_{TX})_{-1}$ in (II-18) takes account of this nonlinearity. Changes in the average taxable maximum will have a different impact upon average taxable wages depending upon how much average covered wages already exceed the taxable maximum. When covered wages are high relative to the taxable maximum, and hence β'' is small, raising the taxable maximum will tend to have a larger impact on average taxable wages since nearly all persons will have wages which exceed even the new, higher taxable maximum. The factor $(\frac{1}{\beta''_{-1}})^2$ attempts to adjust crudely for this effect. Together the two

Figure II-3

Average Wages, Average Taxable Wages, and the Average Taxable
Maximum of Workers Covered by State UI, 1950-1965
(All figures in thousands of dollars)



Source: Appendix B-3

explanatory factors $\overline{W}_C^{UI}$ and $\overline{TM}$ explain about one-half of the variation in the change in average taxable wages under State UI.

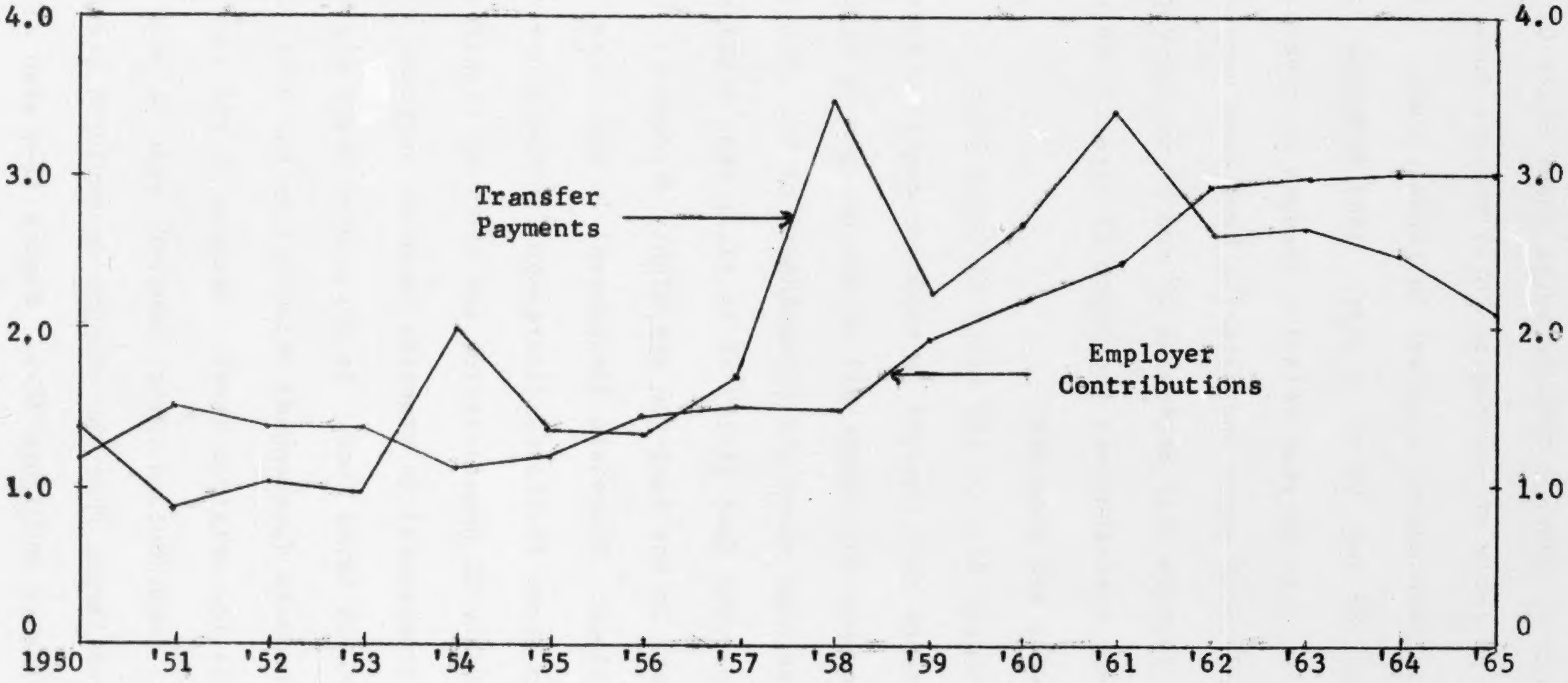
γ'', the ratio of covered to total private non-farm wages and salaries has been nearly constant in recent years. Since 1956 it has been between .88 and .90 every year. (See Appendix B, Table B-3.) Consequently, year to year relative changes in covered wages and salaries and total wages and salaries have been very similar. Knowing γ'' and the factors that determine α'' and β'' we can employ (II-15) to link employer contributions for State UI directly to total private, non-farm wages and salaries.

(c) The Overall Size of the State UI Trust Fund

We stated that changes in employer contributions and transfer payments account for almost all of the changes in State UI trust fund. From what we know about the determinants of the contribution rates for covered employers (see II-16) it is clear that transfer payments and contributions in the long-run are highly dependent. We can summarize this as follows: Increases (decreases) in the overall state of aggregate demand cause decreases (increases) in unemployment, hence the number of State UI beneficiaries and State UI transfer payments. Decreases (increases) in transfer payments increase (decrease) the size of the State UI trust fund. In subsequent years employer contribution rates are reduced (increased) which brings the State UI trust fund back towards its original level. Because of the lags in the adjustment of employer contribution rates, however, year to year changes in transfer payments are larger than the changes in employer contributions. This is shown clearly in Figure II-4. Figure II-4 also shows that in a

Figure II-4

State Unemployment Insurance Contributions and
Transfer Payments, 1950-1965
(All figures in billions of dollars)



Source: Table II-2

period of sustained high unemployment, transfer payments can exceed employer contributions for a number of years, 1957 through 1961. There follows, however, a period when contributions consistently exceed transfers, 1962 through 1965, as the trust fund is gradually restored to its previous level. In the long-run the level of the trust fund does not change greatly. Thus, Table II-2 shows that the 1950 level of the State UI trust fund of $7.0 billion is not greatly different from the 1965 level of $8.5 billion.

3. Summary of the Social Insurance Sector of the U. S. Economy

Having examined the financial operations of OASDHI and State UI, we consider this a sufficient analysis of the internal workings of the social insurance sector of the economy. Although we could examine the trust fund activities of other retirement, disability and unemployment insurance systems, the basic behavior would not be greatly different. The cumulative difference between inpayments, largely contributions, and outpayments, largely transfers to beneficiaries, determines the size of the program's trust fund at any point in time. It is the contributions and transfer payments, however, which are of economic importance because they are linked to aggregate demand, costs and prices in the economy as a whole. And, these relationships are what we will next examine.

One important point needs to be emphasized in discussing the social insurance sector and that is the link between transfer payments and contributions. We have described in some detail the financial operations of two social insurance programs. With both OASDHI and State UI we have employed a basic equation that shows explicitly the factors that cause the size of trust funds to change. In both cases this basically has meant studying the determinants of transfer payments and contributions. Since the overall size of the trust fund for these two programs has been quite stable in recent years, this means that contributions and transfer payments in the long-run are not independent. Thus, an increase in transfer payments, from either OASDHI or State UI, will tend to be matched by a rise in contributions, although not necessarily in the same year. This means that when we try to measure the impacts of social insurance on the level and stability of aggregate demand in the U.S. economy we must recognize that when transfers change, contributions will also be affected and that both will have effects on demand, costs and prices.

B. The Relationship of Social Insurance to the Rest of the Economy

Contributions for social insurance and transfer payments have effects on the level of disposable income, corporate profits, wages, and prices. Consequently, when the provisions of social insurance programs change, they induce changes in the overall level of aggregate demand and employment in the economy. To make our subsequent estimates of how much social insurance influences demand, however, it is important to indicate clearly how social insurance contributions and transfer payments fit into the overall workings of the economy.

1. Government Transfer Payments

Government transfer payments and GNP are related in two ways. Most transfer payments take place irrespective of the current level of economic activity. Higher levels of transfers raise disposable income, consumption and GNP. The line of causation flows from transfer payments to GNP. For unemployment insurance transfers, however, the relationship is two way. When demand changes causing total production to change, this changes employment and unemployment, hence the volume of State UI transfers. Changes in the transfers, in turn, effect GNP when they are spent. This two way link from GNP to transfers is important because it tends to stabilize disposable income when the level of production changes. It reduces the size of the multiplier making the economy more stable.

The composition as well as the level of consumer demand is affected by government transfer payments. The spending patterns of persons receiving government transfers are different from those of other consumers. Because they go almost completely to persons with low levels of disposable income, very small amounts of government transfers are used to purchase new automobiles and other durable goods. Mostly they are used to purchase basic necessities such as food, clothing and shelter. Transfer payments, although small relative to disposable income, have been increasing as a fraction of disposable income. Between 1951 and 1965 they rose from 5.1 to 7.9 percent of the total. Because of the spending patterns of recipients, this growth in transfer payments is changing, in a small way, the composition of consumer demand away from autos and other luxuries towards nondurable goods and services.

2. Employee Contributions for Social Insurance

Employee contributions for social insurance also influence aggregate demand through their effects on disposable income and consumption expenditures. When contribution rates rise they reduce disposable income, or at least reduce its rate of growth. Although it is possible that some persons react to increases in contributions by reductions in savings leaving consumption expenditures unchanged, it is probably more common to reduce consumption as well as savings when employee contributions are increased. If people making contributions exhibited the same spending patterns as people receiving transfers, increasing contributions would have exactly the same effects on GNP as on equal reduction in transfers.

3. Employer Contributions for Social Insurance

There are two types of employers who make contributions for social insurance, government and private employers. Contributions by governments have no effects elsewhere in the economy. When contributions rise there are no effects on demand or prices, merely increased flow into trust funds which are also within the government sector of the economy. Since the increased contributions do not directly affect government demand for goods and services, it is necessary for taxes to be increased. Private employer contributions, on the other hand, affect profits, prices, wages, and overall demand. This is a rather complicated phenomenon which we will examine in two parts; (a) the incidence of private employer contributions which are also known as payroll taxes, and (b) the effects of payroll tax incidence on aggregate demand.

(a) The Incidence of Private Employer Contributions for Social Insurance

A firm can respond to higher payroll taxes in three ways. i) It may do nothing, in which case it will experience higher costs and lower profits. The markup of price over unit variable costs would be observed to decline following the increase in the payroll taxes. ii) A firm may raise prices in response to higher payroll tax rates. This passes the tax forward to the firm's buyers. In most cases, the buyer is another firm. If that firm behaves similarly it would have two incentives to raise prices, higher payroll taxes and higher costs of purchased materials. iii) It is also possible that the firm will shift the burden of higher payroll taxes back to its workers by restraining the growth in wages and salaries by the amount that taxes increase. These last two employer reactions are similar because some other economic unit is actually made to bear the burden of the higher taxes. Employers shift the tax forward when they raise prices and backward when they reduce wages.

More crucial than the direction of tax shifting is whether or not payroll taxes actually are shifted. When the tax is not shifted profits decline and there is a small reduction in disposable income due to smaller dividend payments. When the tax is shifted real disposable income is reduced by a larger amount. Forward shifting means higher prices at the current flow of production and disposable income while backward shifting reduces the size of disposable income at the current rate of production leaving prices unaffected. In either case, real disposable income, disposable income divided by the price deflator for consumer goods, is reduced.

It is convenient to consider forward and backward shifting together since either leaves the markup of price over unit variable costs unchanged. If, on the other hand, the tax is not shifted this ratio will decrease whenever the contribution rate for employers is increased.

From the preceding development we can see that inferences about the incidence of payroll taxes might be made from a study of markups over some period when payroll tax rates changed. There were a number of changes in the employer contribution rates for both State Unemployment Insurance and OASDHI between 1952 and 1965. Data on material costs, payroll and other labor costs, and value of shipments which are necessary to calculate markups can be obtained for the manufacturing sector of the economy for these same years. Although we do not have data on payroll taxes paid by manufacturers, we do know supplements to wages and salaries which is the sum of payroll taxes plus other labor income. Other labor income consists primarily of employer contributions to private pension and welfare funds.

Manufacturing markups were quite stable between 1952 and 1965. Figure II-5 shows two series for the ratio of price to unit variable costs for this 14-year period.[8] The only difference in the two markups is that one leaves out supplements to wages as a part of unit variable costs. Both markups show upward trends between 1952 and 1965 but the trends are very small. The markup of price over wages plus material costs (m_1) increased from 1.300 to 1.333 while the markup of price over wages plus material costs plus supplements to wages (m_2) rose from 1.280 to 1.302. Probably the main reason for the trend in the two markups is that fixed costs (depreciation, indirect business taxes, and salaries) grew more rapidly than variable costs during these years. They rose from 14.9 percent of total costs in 1952 to 17.4 percent in 1965. To cover the growing importance of fixed costs employers would

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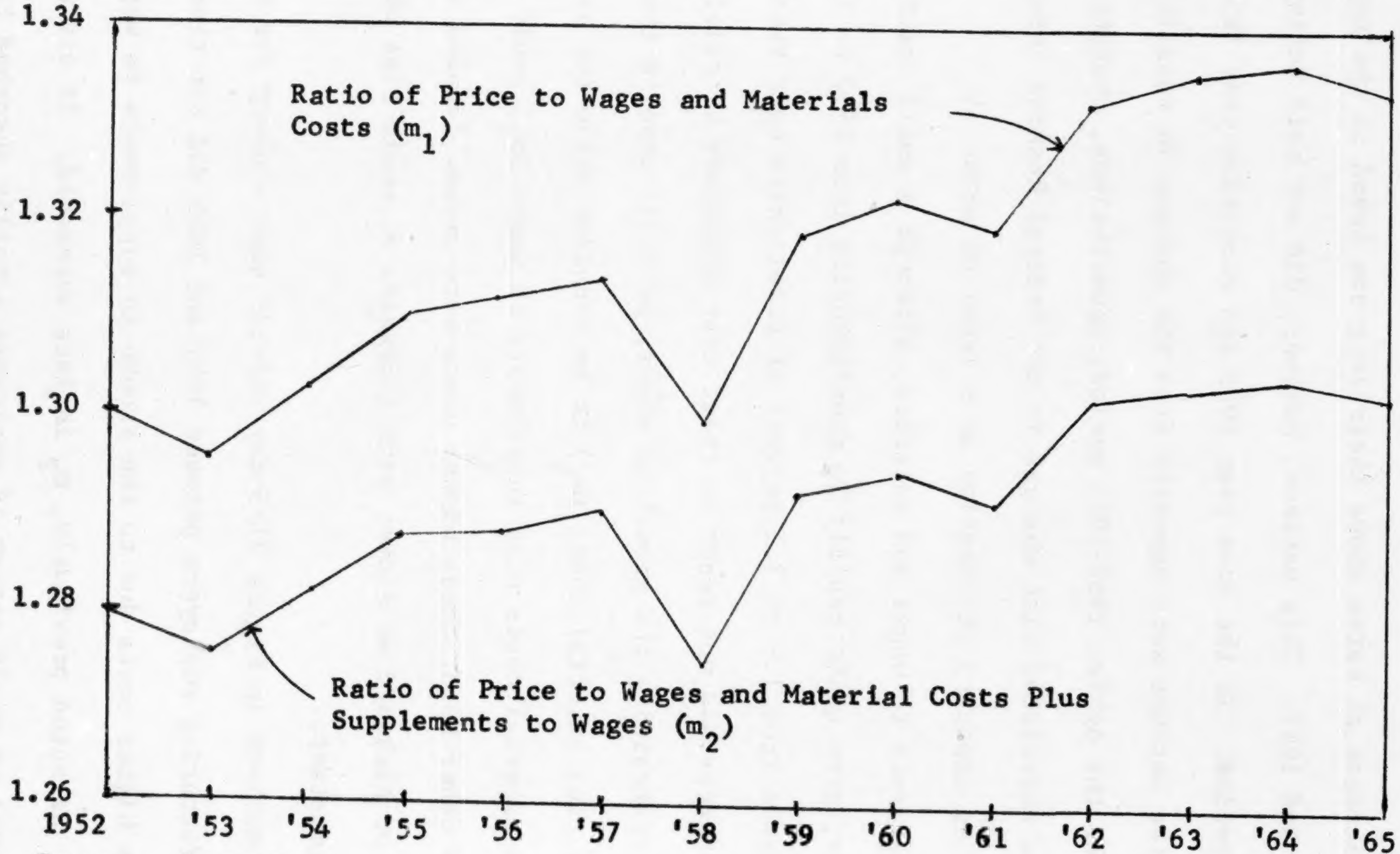
[8] See Appendix C for the derivation of these markups.

Figure II-5

Manufacturing Markups, 1952-1965



Source: Appendix C

be expected to raise prices, thus increasing the ratio of price to unit variable costs.

Besides a small upward trend, the markups in Figure II-5 also show a cyclical pattern. They decline in the recession years 1958 and 1961 and then increase at rates above their long-run trend in the recovery years 1959 and 1962. This pattern, however, did not hold during the 1953-1955 period. In the boom year 1953 and recession year 1954, the change in the markups were opposite from the changes in capacity utilization. For the entire 1952-1965 period, nevertheless, changes in the two markups correlated with changes in the Federal Reserve index of manufacturing capacity utilization at a level of about .5.

Supplements to wages and salaries, although a small fraction of total costs, grew quite rapidly in manufacturing from 1952 to 1965. They increased from 1.9 to 3.1 percent of total costs over these years. If manufacturers did not react to these cost increases by raising prices or restraining the growth in wages, we would observe the markup over wages plus material costs (m_1) to be constant while the markup over wages plus material costs plus supplements to wages (m_2) would decline. If, on the other hand, these higher costs were passed forward as price increases or backward as slower wage increases m_1 would rise while m_2 would be constant.

The markups in Figure II-5 may provide some support for the idea that manufacturing employers between 1952 and 1965 did not themselves absorb the higher costs due to the growth in supplements to wages and salaries. As noted previously, m_2 in fact increased. It did not decrease which is what we would expect if employers actually absorbed these higher costs themselves. This evidence is at best, however, highly tentative. Markups were rising slightly in these years from other causes. Only if we could remove the effects of other factors from the trend in the markups in Figure II-5 would we be able to make stronger statements about the incidence of the higher costs caused by larger supplements to wages and salaries. Even then, however, because supplements to wages and salaries are so small relative to total costs, we might not know the incidence of these higher costs with much certainty.

(b) Payroll Tax Incidence and the Level of Demand

Regardless of the incidence of payroll taxes, higher tax rates reduce aggregate demand. If higher taxes are passed forward or backward this reduces real disposable income, hence consumer demand. If, on the other hand, the higher taxes are actually paid by employers, corporate profits will be reduced. This, in turn, will reduce after tax profits, retained earnings and dividend payments. Lower dividends will result in some reduction in consumer spending while lower retained earnings will reduce investment expenditures. When payroll taxes are actually borne by employers the immediate effects on expenditures are much smaller than the ultimate effects because there are substantial lags in the adjustment of both dividend payments and investment expenditures to changes in after-tax corporate profits.

A one billion dollar increase in payroll taxes that reduced corporate profits by the same amount would produce effects in the economy which would occur over a long period. Given the current marginal tax rates on corporate profits levied by State and local governments as well as the Federal government, about half of the lower profits would be absorbed by governments as reduced profits tax receipts. The other half billion would be the amount by which after-tax profits are reduced. Lower after-tax profits are distributed between dividends and retained earnings with most of the reduction occurring in retained earnings. Dividend payments are quite stable in the face of changes in after-tax corporate profits. For the years 1950-1966 the following relation held:

$$\text{(II-19)} \qquad \Delta DIV = \underset{(.015)}{.134}\Delta CP_{at} + \underset{(.016)}{.064}\Delta CP_{at_{-1}} + .460$$

$$\bar{R}^2 = .87$$

where

DIV = dividend payments

CP_{at} = corporate profits after tax

From (II-19) we would estimate that an increase of one billion dollars in after-tax profits would raise dividends by 134 million this year and by an extra 64 million next year. When we recognize that dividends are taxable at an average marginal rate of about 20 to 25 percent and that the MPC for annual changes in disposable income is about two-thirds, we conclude that the effects on demand which result from changed dividend payouts are quite small.

The part of profits that is not paid out as dividends remains with corporations as retained earnings. Recent studies of investment behavior indicate that cash flow from current operations (retained earnings plus depreciation allowances) is an important determinate of new capital appropriations and investment expenditures. Thus, higher payroll taxes, if paid by employers, lead to reductions in investment. These investment studies also show that there are long lags between changes in cash flow and changes in investment.[9] Although there is not general agreement of the exact profile of the lag structure which links investment to cash flow, there is reasonable agreement that it is lengthy. Using annual data for the whole private sector of the economy, the following relation was found which explains most of the annual variation in plant and equipment expenditures:[10]

$$\text{(II-20)} \qquad \overline{PE} - \sum_{i=0}^{-2} w_i \overline{PE}_{i-1} = \underset{(.065)}{.185} \sum_{i=0}^{-2} w_i \Delta(\bar{G}^* - \bar{C}^*)_i + \underset{(.200)}{1.110} \sum_{i=0}^{-2} w_i \Delta(\overline{CRE} + \overline{CCA})_i - .126$$

$$\bar{R}^2 = .94$$

where

$\overline{PE}$ = expenditures for plant and equipment (in billions of 1958 dollars)

$(\bar{G}^* - \bar{C}^*)$= the difference between actual private output and capacity output (in billions of 1958 dollars)

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[9] For example, Shirley Almon, "The Distributed Lag Between Capital Appropriations and Expenditures," Econometrica, XXXIII (January, 1965), pp. 178-196. She finds expenditures depend upon appropriations with a lag of about eight quarters. If we add to this lag between changes in cash flow and changes in appropriations, it seems reasonable to say that changes in cash flow will have effects lasting over a three-year period.

[10] The coefficients in this relationship are really not known with much certainty. For example see: W. H. Locke Anderson, "Business Fixed Investment: A Marriage of Fact and Fancy," Determinants of Investment Behavior, A Conference of the Universities - National Bureau Committee for Economic Research (New York: National Bureau of Economic Research, 1967). This article cites many of the most recent empirical studies of business fixed investment.

$\overline{CRE}$ = corporate retained earnings (in billions of 1958 dollars)

$\overline{CCA}$ = corporate capital consumption allowances (in billions of 1958 dollars)

$w_0 = .33$, $w_1 = .50$, $w_2 = .17$.

The lag structure implied in (II-20) is that a billion dollar reduction in retained earnings would reduce investment by .37 [=.33 x 1.110] billion in the current year and then by .56 and .19 billion in the next two years respectively. Because of the lag previously noted in the dividend payout relation (II-19) the effects of a change in profits after tax on investment would be felt over a period of four years. That is, retained earnings rise when after-tax profits rise in year zero and effects are thus felt on investment in years zero, one, and two. In year one, however, retained earnings fall slightly as dividends continue to rise towards their equilibrium level. This change in retained earnings affects investment in years one, two and three. Thus, the entire period when investment is directly affected by changes in after-tax profits includes years zero through three while dividends, hence consumption, are directly affected in years zero and one.

From the preceding development we can see that the question of how higher employer contributions for social insurance (payroll taxes) affect demand is not simple. We have traced the possible effects on prices, wages, consumption and investment. The behavior of manufacturing markups suggest that employer contributions are shifted but we cannot be sure of this. Thus, we cannot be certain whether the main effects of these contributions are on consumption or investment. We can be sure, however, that when contribution rates rise the effects are spread across a lengthy period because of lags in price adjustments, dividend payouts and investment expenditures.

4. Self-Employed Contributions for Social Insurance

Self-employed contributions for social insurance also pose a problem of tax incidence. In this case, however, backward shifting is the same as if the self-employed person actually pays the tax himself since he is the employee. The alternative to no shifting, then, is forward shifting. The actual incidence of the self-employed payroll tax is not known. For convenience we will treat self-employed persons like other employers and assume they shift the tax on to their customers.

5. Summary - Social Insurance and Demand

Social insurance affects aggregate demand in the economy in two ways: transfer payments, and employee contributions affect consumption expenditures.

Employer contributions affect either consumption, or investment, or both depending upon their incidence. From the examination of manufacturing markups in section B-3 of this chapter it seems reasonable to say that employer contributions are shifted but the direction of shifting, forward as higher prices or backwards as lower wages, is not known. Thus, the impacts of transfer payments and contributions for social insurance (by employers, employees, and the self-employed) are primarily on consumption expenditures. In Chapter III we will estimate the size of these impacts on demand.

CHAPTER III

SOCIAL INSURANCE AND THE LEVEL AND STABILITY OF DEMAND

The purpose of this chapter is to examine empirically how social insurance affects the level and stability of aggregate demand in the economy. To accomplish this, the chapter is organized into three main parts. In part A we explain the methodology for our analyses. Here we describe the Michigan Econometric Model of the U. S. Economy and how it is used to estimate effects of social insurance on aggregate demand. We employ the model in part B to estimate how much changes in social insurance programs affect the level of demand. Two examples were chosen, the Temporary Extended Unemployment Compensation (TEUC) Act of 1961 and the 1965 Amendments to the Social Security Act. Part C is an analysis of how social insurance, particularly unemployment insurance, affects the built-in stability of demand in the economy. Here we note the size of the impact multipliers in the econometric model and how they change when social insurance laws are modified.

We find that: (1) TEUC added $1.10 billion to real output in 1961 and a total of $1.9 billion between 1961 and 1966; (2) The OASDHI Amendments of 1965 raised aggregate demand by $2.7 billion in that year. In 1966 however, the impact of the Amendments was to reduce real GNP by $3.6 billion; (3) Social insurance adds noticeably to the built-in stability of the U. S. economy. Its presence reduces the impact multiplier of government expenditures from 2.50 to 2.02;

(4) Liberalizing coverage and the benefit features of State Unemployment Insurance would further reduce the impact multiplier of government expenditures from 2.02 to 1.59; (5) The link between State UI transfer payments and employer contributions reduces by about one-fourth the effectiveness of State UI as an automatic stabilizer in the economy.

A. The Michigan Econometric Model of the U. S. Economy

Our analysis will be based upon the Michigan Econometric Model of the U. S. Economy. This is a short-run forecasting model compiled each year at the University of Michigan by the Research Seminar in Quantitative Economics under the direction of Professor Daniel B. Suits. Although one main use of the model is to make GNP forecasts, it can also be used to analyze the macroeconomic effects of changes in the structure of the U. S. economy.[1]

1. The Main Features of the Model

The model is a set of simultaneous equations each of which predicts an important economic variable such as auto purchases, GNP, corporate profits, or employment. The equations are organized into a number of sectors, e.g. aggregate demand, employment and the labor force, and income. Within each sector certain magnitudes are said to be "exogenous." They determine the behavior of the economy but are not in turn influenced by other parts of the economy. The labor force is a good example. Its size is determined by the number of people in different age groups in the population and the labor force participation rates specific to each of those groups. Since both the population and the age-specific participation rates are treated in the model as determined by non-economic factors, the labor force is exogenous. When the labor force grows this will affect unemployment in the economy but changes in unemployment will not in turn affect the growth of the labor force.[2]

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[1] For a detailed description of an earlier version of this model and its uses, see Daniel B. Suits, "Forecasting and Analysis with an Econometric Model," _American Economic Review_, LII (March, 1962)

The "endogenous" economic variables in the model differ from the exogenous variables being not only determinants of the behavior of the economy but also determinates of the economy's performance. Consumer demand is a good example. It is one of the factors that determines the size of total GNP but it is also influenced by total GNP because as GNP changes it alters the level of disposable income, the major determinant of changes in consumer spending. Thus as with all endogenous variables consumer spending not only determines the economy's fluctuations but also is determined by those same fluctuations.

The particular version of the econometric model which we will use is very similar to the one employed to make the 1967 GNP forecast. This appears in The Economic Outlook for 1967.[3] The version of this particular model which we will use differs from the original in that: (i) the automobile and other durable consumer demand equations have been modified; (ii) the money sector has been eliminated, thus making housing expenditures completely exogenous; (iii) the social insurance sector has been expanded to incorporate all of the relationships described in Chapter II; (iv) the price sector and income sector were also modified. Because employer contributions for social insurance are closely related to both prices and corporate profits, we need to discuss these further.

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[2] Recent work by Dernberg and Strand would strongly dispute this contention. See Thomas Dernberg and Kenneth Strand, "Cyclical Variation in Civilian Labor Force Participation," Review of Economics and Statistics, XLVI (November, 1964), pp. 378-391.

[3] Ann Arbor, Michigan: Braun-Brumfield, Inc., 1968.

The price sector of the econometric model consists of two equations which describe the movements in the private non-farm GNP deflator and the consumer expenditures deflator:[4]

$$\text{(III-1)} \qquad \Delta P^* = \underset{(.092)}{.734\Delta ULC} + \underset{(.106)}{.418\Delta ULC} + \underset{(.042)}{.080\Delta CU} + .0049$$

$$R^2 = .87$$

$$\hat{\sigma}_U = .0032$$

where

P^* = the price deflator for private, non-farm GNP.

ULC = unit labor costs in the private, non-farm sector. This is employee compensation (wages and salaries plus other labor income plus employer contributions for social insurance) divided by real GNP.

CU = capacity utilization.

In (III-1) prices depend on unit labor costs and capacity utilization. When unit labor costs rise, however, the full adjustment of prices is spread over a two-year period with about two-thirds occurring in the same year when costs rise. The sum of the two coefficients, 1.162, is consistent with the idea that employers pass increases in labor costs forward as price increases. This means that in the long-run an increase in labor costs will not greatly alter the distribution of income in the economy between labor's share and profits.

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[4] All symbols used in this chapter appear in Appendix A along with definitions.

Consumer prices in the model depend upon the private non-farm GNP deflator and the farm GNP deflator. The relationship for 1955 through 1965 was:

$$\text{(III-2)} \qquad \%\Delta P_c = \underset{(.097)}{.620}\%\Delta P^* + \underset{(.017)}{.074}\%\Delta P_f + .00387$$

$$\bar{R}^2 = .87$$

where

P_c = the consumer expenditures price deflator

P_f = the farm GNP deflator

(III-2) indicates that the consumer expenditures deflator is affected both by rises in industrial prices and farm prices. The positive intercept reflects the secular rise in the prices of services purchased by consumers. The coefficient on % ΔP^* of .620 is important to us because it implies that when the private non-farm GNP deflator rises only 62 percent of this increase gets translated into a rise in consumer prices. Thus if industrial prices rise real disposable income is reduced but not by as much as it would be if this coefficient in (III-2) were 1.0 rather than .620.

Corporate profits in the econometric model are determined by the following relation:

$$\text{(III-3)} \qquad \Delta CP = \underset{(.055)}{.904}\Delta(NI_{nf} - W - SI_r^P) - .849$$

$$R^2 = .97$$

$$\hat{\sigma}_U = .88$$

where

CP = corporate profits plus the inventory valuation adjustment.

NI_{nf} = private, non-farm national income.

W = private wages and salaries plus other labor income.

SI_r^p = private employer contributions for social insurance.

(III-3) which was estimated for the years 1955-1965 shows that nearly all of the variations in private non-labor national income is accounted for by variations in corporate profits. In other words, there are not very large year-to-year changes in proprietor's income, rent and interest. On the margin corporate profits account for ninety percent of the annual changes in the non-labor component of private, non-farm national income. The high $\bar{R}^2$ in (III-3) is evidence that this ninety-percent split-off of corporate profits from non-labor national income is quite stable from year to year.

Combining (III-1), (III-2), and (III-3) shows how employer contributions for social insurance fit into the econometric model. When contributions increase, this raises unit labor costs, hence prices. Because of the lags implied by (III-1), however, prices do not make their full adjustment until one year later. The increase in prices increases private, non-farm GNP in current dollars, hence national income. The increase in contributions has two effects on corporate profits which can be seen in (III-3). Increasing employer contributions tends directly to reduce corporate profits because it reduces non-labor national income but this is offset by the increases in total national income resulting from price increases. The net effect of higher employer contributions, then, is not to reduce corporate profits because prices rise. [illegible] increase in prices gets translated into higher prices for consumer goods and reduces real disposable income, hence consumption. The model, in other words, treats employer contributions for social insurance as a cost which results in higher prices each time contributions are increased. The incidence of these contributions in the model, then, is the same as we assumed in the previous chapter (recall the discussion of Chapter II, section B-3). We treat these taxes as borne by consumers not by businesses.

2. How the Model is Solved

The model is solved by a simple iterative procedure.[5] For a particular year the actual values of all coefficients, exogenous variables, and lagged endogenous variables are combined with some preliminary estimate of the current endogenous variables. This estimate can be the value of the endogenous variable in the previous year. Then this information is inserted into each equation to yield an initial forecast for the set of endogenous variables. The forecast values are then used to replace the initial estimates of the current endogenous variables thus turning out a second forecast. This technique of inserting the forecast values back into the individual equations is repeated until two successive forecasts are so similar that they can be considered identical. The criteria for determining when the solution has been reached can be as precise as one would like. In the results to be discussed in this chapter we considered the system to be solved when the forecast of real GNP was less than $1 million different from the forecast of the previous iteration.

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[5] The author is deeply indebted to Barry Bosworth of the Research Seminar in Quantitative Economics who wrote the computer program for this solution procedure and who corrected many of the author's mistakes while using this program.

This iterative solution procedure can be used to give long-run as well as short-run estimates of the effects of structural changes in the economy or changes in expenditures. Each year the initial value of the endogenous variable used in the iteration procedure can be the lagged value obtainable from the solution for the previous year. Repeating this process for a number of consecutive years, one can simulate the behavior of the economy over a long period of time. For example, one could estimate the long-run as well as the impact effects of a $1 billion increase in government expenditures. In 1960 the impact multiplier of such an increase on real GNP was $1.78 billion. If the increase in expenditures was to be sustained over a long period of time, the long-run effect on GNP would be larger. We estimate that the effect by 1966 wouldbe $3.06 billion. The difference in the size of the one year and seven year multipliers is due to lags in the response to changes in demand of such variables as prices and employment. The procedure just discussed enables us to incorporate these lags when we estimate the effects of social insurance on demand.

We estimate these effects by changing the variables and coefficients in the social insurance equations in the econometric model and then comparing solutions before and after the changes. For example, if we wanted to know how much more stable the economy is because of State UI transfer payments, we would first estimate the multiplier, say the government expenditures multiplier. We then remove the State UI transfer payments equation from the model and re-estimate that multiplier. Comparing the two, we would have an estimate of the stabilizing influence of these transfers. Parts B and C of this chapter will consist of repeated applications of this technique.

B. Social Insurance and the Level of Aggregate Demand

In this section we examine how changes in transfers and contributions offset the level of demand. To do this we first estimate the multipliers for transfer payments, employee contributions, employer contributions, and self-employed contributions. Then we examine two recent changes in social insurance programs applying these multipliers to the observed changes in transfers and contributions to see how much GNP was affected by these changes. The two selected were (1) the changes in transfers and contributions in 1965 and 1966 as a result of the 1965 OASDHI legislation; (2) the increases in transfers and contributions associated with the Temporary Extended Unemployment Compensation (TEUC) program of 1961-1962. For this second case, because we have data for a number of years after enactment of the program, we have estimated the long-run effect as well as its impact on GNP in 1961 and 1962.

We find that: (a) The increase in OASDHI transfers of $1.4 billion in 1965 caused real GNP to increase by $2.7 billion in that year. When transfers further increased by $1.7 billion in 1966, their impact was to raise real GNP by $3.1 billion. (b) The increases in OASDHI contributions rates and the taxable maximum which occurred on January 1, 1966 reduced real GNP in 1966 $6.7 billion. Thus the net effect of the amendments in 1965 was to raise real output by $2.7

billion but in 1966 as contributions and transfers both increased, GNP was reduced by $3.6 billion. (c) The TEUC transfers of 1961 raised real GNP in that year by about $1.10 billion. (d) The long-run effect of TEUC, however, was even more expansionary, accounting for a total increase in real GNP of $1.9 billion between 1961 and 1966. The existence of higher employer taxes in both 1962 and 1963, however, reduced the long-run expansionary effect of TEUC on real GNP by $.9 billion from $2.8 billion to $1.9 billion.

1. The Social Insurance Multipliers

Changes in government transfer payments and contributions for social insurance (by employers, employees, and the self-employed) have measurable effects on the levels of GNP, employment and prices. The multiplier effects of social insurance on these three are summarized in Table III-1. For example, we estimate that the effect on 1965 real GNP of a $1 billion increase in government transfer payments was 1.91 billion dollars measured in 1958 prices. This is shown in row 2 of the table. This is the largest of the impact, or one year, multipliers for the social insurance sector. To give some standard of comparison, the multiplier for government purchases, shown in row 1 of Table III-1, was 2.02. The transfer payments multiplier is nearly as large as the government expenditures multiplier. Because the social insurance multipliers are quite large, changes in social insurance programs can have large effects on GNP and employment which we will presently examine. Here, however, we will discuss how the social insurance multipliers were estimated and compare them to each other. So that all the results will be comparable, we will discuss the effect on real GNP measured at

TABLE III-1

SOCIAL INSURANCE MULTIPLIERS ON GNP, EMPLOYMENT, AND PRICES

a one billion dollar increase in	Effect on		
	GNP (in billions of 1958$)	Employment (in millions)	GNP Deflator (1958=100.0)
1. Government expenditures	2.02	.14	.1
2. Government transfer payments	1.91	.13	.1
3. Employee contributions	-1.58	-.11	-.2
4. Private employer contributions	-.83	-.06	.1
5. Private employer contributions, no shifting	-.70	-.05	-.1
6. Private employer contributions, immediate and complete forward shifting	-.90	-.07	.1

Source: These estimates were prepared by the author using the University of Michigan Econometric Model of the U. S. Economy.

1958 prices, of a one billion dollar change in transfers and contributions measured at 1965 prices.

Government transfer payments and employee contributions for social insurance affect aggregate demand in the same way through their impact on disposable income, hence consumer expenditures. We, therefore, would expect that the impact multipliers for these two would be roughly equal in size. The multiplier for a $1 billion increase in transfer payments was 1.91 while for employee contributions it was -1.58. Compare rows 2 and 3 of Table III-1. The difference in the absolute size of the two results from the type of spending patterns exhibited by those who receive transfers. Whereas the MPC out of disposable income in the model is .75 we have assumed that the MPC out of transfer payments is .9 and divided equally between nondurable goods and services. No durable goods are assumed to be purchased with transfer payments. This is one way to approximate the spending patterns of transfer payment recipients who are mostly low-income persons. (See the discussion in Section B-1 of Chapter II.)

A one billion dollar increase in private employer contributions for social insurance would lower real 1965 GNP by .83 billion dollars. Unlike the other changes in social insurance note that in this case GNP and prices move in opposite directions. From line 4 of the table we note that while real GNP drops .83 billion the GNP price deflator rises by one-tenth of a percentage point. This implicitly assumes employers raise prices when labor costs rise in the manner shown in equation (III-2). It is also interesting to see how alternative assumptions about employer reactions to increased contributions affect the size of the multiplier. Two are worth noting: (a) If employers do not raise prices but rather suffer reduced profits, the impact multiplier becomes -.70 and prices fall as shown in row 5 of the table. Also in this case, more of the effect on output is felt on fixed investment. It declines by an extra $.09 billion even though this multiplier is smaller. (b) If employers made a full-price adjustment immediately (row 6 of Table III-1), then the multiplier becomes -.9. Thus, regardless of the incidence assumptions made, the size of the multiplier is about the same.

The impact multiplier for self-employed contributions for social insurance is also -.83 if self-employed persons behave like other employers and raise prices when their contributions increase. If, on the other hand, self-employed persons do actually bear the burden of the higher contributions, the multiplier is -1.58, the same as for employee contributions.

From the preceding we conclude that the largest of the social insurance multipliers is the one associated with government transfer payments. In fact this multiplier of 1.91 is nearly as large as the government expenditures multiplier of 2.02. The smallest social insurance multipliers are associated with employer and self-employed contributions, with an absolute size of .83. Occupying an intermediate position is the employee contributions multiplier whose value is -1.58. Because of the way we have estimated these multipliers, i.e., measuring the effect of a one billion dollar change in 1965 on real output measured in 1958 prices, the absolute size of these social insurance multipliers will be different for different years. In particular they will be smaller for more recent years when the general price level is higher. What will be the same for all years is the relative sizes of the social insurance multipliers; the transfer payments multiplier being largest and the employer and self-employed contributions multipliers being smallest. Because these multipliers are quite large, large changes in social insurance programs are capable of producing large changes in GNP and employment. We will measure the effects of two such changes in the next section of this chapter.

Before proceeding there is one last point to mention. In Chapter II we noted that transfer payments have been growing as a fraction of disposable income, and that people who receive transfer payments spend in different patterns from others (Chapter II, section B-1). Consequently, increasing transfer payments and contributions by equal amounts will affect both the level and composition of demand. For example, if transfer payments from OASDHI were raised by $1 billion in 1965 and employee and employer contributions each by $.5 billion, this would raise total real GNP by $.7 billion. It would also alter the composition of consumer demand. Demand for autos and for other durables would fall by $.06 and $.04 billion respectively while demand for nondurables and services would rise by $.29 and $.35 billion respectively. Thus changes in OASDHI, or any other social insurance program, which do not affect the size of OASDHI trust fund, can, nevertheless, affect the level and composition of aggregate demand in the economy. This is especially important in our economy where social insurance transfers and contributions have been growing relative to total disposable income.

2. The 1965 Amendments to the Social Security Act

(a) The Important Provisions

In July 1965 President Johnson signed a bill which called for major revisions of the social security system. The most important provisions were:

(1) The monthly cash benefits of people already receiving OASDHI transfers were increased by 7 percent.

(2) A new health insurance program for the aged was established. This so-called Medicare program had two main parts. Part A provided protection for the aged against hospital costs, to be financed by contributions by employers, employees, and self-employed persons covered by OASDHI. Part B was a voluntary plan whereby older persons could make monthly contributions, initially $3 per month, to become insured against the costs of physicians' services and related medical expenses. The Federal government was to make matching payments from general revenues to help finance these medical costs.

(3) The OASDHI taxable maximum was raised from $4800 to $6600.

(4) The OASDHI contribution rate was increased.

There were other provisions liberalizing eligibility for certain OASDHI benefits (for children aged 18-21, disabled persons, and widows) and extending coverage to medical doctors and to income received in the form of tips.[6] These amendments did not all go into effect at the same time.

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[6] For a complete description of these amendments see Wilbur Cohen and Robert Ball, "Social Security Amendments of 1965: Summary and Legislative History," Social Security Bulletin, XXVII (September, 1965).

The 7 percent increase in benefits was made retroactive to January 1, 1965. The OASDHI tax rate and taxable maximum were both increased on January 1, 1966. The employer and employee contribution rate increased from 3.625 percent to 4.2 percent while the rate for self-employed persons rose from 5.4 percent to 6.15 percent. Older persons started to receive Medicare benefits on July 1, 1966. Thus transfer payments associated with the 1965 amendments increased in both 1965 and 1966 while contribution rates increased in 1966.

(b) The Effects of the 1965 Amendments

The only effects of these amendments on the economy in 1965 was to increase OASDHI transfer payments by 1.4 billion dollars. We estimate that the subsequent spending of these transfer payments started a multiplier process which increased real GNP in that year by $2.7 billion. This increased employment in 1965 by .24 million. This estimate of the impact on real GNP and employment may be somewhat high since the larger monthly benefit payments were first paid in September. Transfer payments of that month were about $1 billion higher than in the previous month as they included the retroactive increased payments for the first eight months of 1965. In the last four months of the year, recipients of these transfers may not have fully adjusted their spending to the new higher level of transfers and also business production may not have fully adjusted to the new higher level of sales caused by the larger OASDHI transfers. For these two reasons, then, the expansionary impact on real GNP may have been less than $2.7 billion.

The impact of these amendments in 1966 was to lower real GNP by about $3.6 billion. This is the net effect resulting from increases in transfer payments as well as contributions. The increase in transfer payments attributable to the 1965 Amendments was roughly $1.7 billion. One billion of this increase was the amount of hospital insurance benefits paid between July 1, when the program went into effect, and the end of the year. The rest was mostly from increased eligibility for retirement, disability and survivor benefits. This $1.7 billion increase in transfers caused real GNP to increase by $3.1 billion in 1966. The increase in the contribution rate and the taxable maximum in 1966 cause private employer contributions for OASDHI to increase by about $2.6 billion. This lowered real GNP by $2.1 billion as employers raised prices in response to these higher labor costs. Employee contributions rose by $3.1 billion of which $.3 billion was voluntary contributions for medical insurance under Medicare. This increase caused real GNP to be lower by $4.6 billion in 1966. Because self-employed persons did not have to pay their 1966 OASDHI contributions until April, 1967, the higher contribution rate and taxable maximum applicable to them did not have effects on GNP in 1966. Combining together the effects on real GNP of transfer payments (+$3.1 billion), private employer contributions (-$2.1 billion), and employee contributions (-$4.6 billion) we estimate that the 1965 Social Security Amendments reduced real GNP in 1966 by $3.6 billion. They reduced employment in the same year by .30 million.

We used (III-1) to estimate the effect of increased employer contributions on the price level in 1966. The $2.6 billion increase in contributions was responsible for an increase in .5 percentage points in the price index for private non-farm GNP. Since the observed increase in the index was 2.8 percentage points, we conclude that increases in employer contributions for OASDHI were responsible for about 18 percent of the observed increase in the GNP deflator for 1966.

3. Temporary Extended Unemployment Compensation of 1961-1962

(a) The TEUC Provisions

Early in 1961 when it was evident that the economy was in a recession, President Kennedy proposed a bill to extend the duration of State UI benefits. This bill, the Temporary Extended Unemployment Compensation Act, or TEUC, was signed into effect in late March of that year. Its main purpose was to provide additional eligibility to persons who exhausted their benefit rights under State UI laws. Extended benefits were to be the same size as regular weekly benefits and in most states unemployed workers could receive the benefits for up to thirteen weeks. Persons could file for TEUC benefits between April 1, 1961, and April 1, 1962, and receive these benefits as late as July 1, 1962. TEUC benefits were to be financed by increasing the employer contribution rate for the Federal Unemployment Tax in 1962 and 1963. The rate was raised from .4 percent of taxable wages in 1961 to .8 percent in 1962 and 1963. Subsequently the 1963 rate was reduced to .65 percent so that total contributions would not exceed total benefit payments of the TEUC program.

(b) The Effects of TEUC

In 1961 and 1962, 2.78 million workers received TEUC benefits totaling $.82 billion. About $.6 billion of the benefits were disbursed in 1961 and $.2 billion in 1962. TEUC employer contributions amounted to $.5 billion in 1962 and $.3 billion in 1963. Since the only TEUC provision in effect in 1961 was the \$.6 billion of transfer payments, the program accelerated the recovery from the recession. The transfer payments added about \$1.1 billion to aggregate demand in 1961. The net effect of TEUC in 1962 was about zero. The \$.2 billion of transfer payments added about \$.4 billion to real GNP but the \$.5 billion of employer contributions reduced real GNP by \$.4 billion. Since the only part of TEUC still in effect in 1963 was the higher employer contributions, it tended to reduce real GNP in that year by about \$.2 billion. Over the three years, then, the impact effect of TEUC on demand was positive in 1961; about zero in 1962; and slightly negative in 1963.

We have also examined the long-run effects of TEUC as well as the impacts of its specific provisions in 1961, 1962, and 1963. We did two simulations for the years 1961 through 1966, including all TEUC provisison for 1961-1963 the first time and then excluding them in the second run. Comparing the two series of solutions enables us to measure the effects of TEUC in all years from 1961 through 1966. Because of lags present in the economy's behavior, the long-run effects of TEUC will be different than the impact effects reported in the previous paragraph. For example the TEUC transfers of 1961 had effects on the economy in 1962 as well as in 1961. We found that TEUC raised real GNP by \$1.1 billion in 1961, by \$.6 billion in 1962, lowered it by \$.1 billion in 1963 and by \$.1 billion in 1964. In both 1965 and 1966 it raised real GNP by \$.15 billion as the lagged effects of the transfer payments were still being felt. Adding the effects from all years, we estimate that the cumulative net impact of TEUC on real GNP between

1961 and 1966 was to increase it by $1.9 billion.

This $1.9 billion cumulative net effect on real GNP might be called a social insurance balanced budget multiplier effect. TEUC contributions and transfer payments both amounted to just over $.8 billion. Thus the long-run TEUC balanced budget multiplier is 2.36. The $.8 billion increase in transfer payments raised real GNP by $2.8 billion between 1961 and 1966 while the equal increase in employer contributions reduced real GNP by $.9 billion between 1962 and 1966. The timing of this multiplier effect is also interesting. In 1961 TEUC added $1.1 billion to real GNP and between 1962 and 1966 it further added $.8 billion to real GNP as the lagged effects of the 1961 transfers along with the effects of the $.2 billion of 1962 transfers more than exceeded the effects of contributions made in 1962 and 1963. It is also interesting to consider what effect the timing of the contribution provisions had on the size of the long-run effect of TEUC. If the first contributions had been due earlier, say sometime in 1961, the initial expansionary effect of TEUC would undoubtedly have been less than $1.1 billion. Also the long-run expansionary effect would have been smaller than $1.9 billion.

4. Summary

Three points need to be emphasized about the relationship of social insurance to aggregate demand in the economy. First, changes in social insurance provisions have measurable, if modest, impacts on the level of aggregate demand. This is true even if the changes in question call for equal increases in transfer payments and contributions, because the multiplier associated with social insurance transfers is larger than the multiplier for employee contributions and much larger than the multiplier for employer and self-employed contributions. Second, equal increases in transfer payments and contributions affect not only the level but also the composition of aggregate demand. Equal increases in both tends to shift consumer demand away from durable goods towards nondurable goods and services. Third, because social insurance does affect the level of demand, hence employment of resources in the economy, effective stabilization policy needs to recognize that these effects exist in order to better balance demand against the economy's productive capacity. This last point merits some emphasis. Changes in OASDHI of the kind in the 1965 Amendments had quite large effects on demand in both 1965 ($2.7 billion) and in 1966 ($3.6 billion). As the OASDHI system continues to grow it will have comparable and even larger future effects on aggregate demand. These must be recognized if prices and demand are to be effectively stabilized in the economy.

C. Social Insurance and the Stability of Aggregate Demand

Social insurance, particularly unemployment insurance transfer payments, adds considerable stability to aggregate demand in the economy. We estimate, for instance, that the impact multiplier of government expenditures on real GNP is reduced from 2.50 to 2.02 because of social insurance. As a stabilizer of aggregate demand social insurance is about seven-tenths as strong as the Federal personal income tax. The stabilizing role of social insurance would be further enhanced if State UI weekly benefits were raised, duration of benefits increased, or if coverage was expanded to include workers now excluded. The stabilizing effects of unemployment insurance would be further increased if the link between State UI transfers and the contribution rate for employers were to be eliminated. These conclusions are the result of an investigation which was divided into four main parts. We first discuss automatic stabilizers and how they stabilize aggregate demand. We next derive estimates of the stabilizing influences of social insurance and compare these with another automatic stabilizer, the Federal personal income tax. In the last two sections we discuss possible changes in State UI benefits and financing. The effect of changing the size of weekly benefits, the maximum duration of benefits, and the extent of covered employment are all examined. Finally, we estimate how much the link between State UI transfers and the employer contribution rate affects the long-run performance of State UI as an automatic stabilizer.

1. Automatic Stabilizers

When the level of production changes, this generates income and leads to increases in spending by those receiving the added income. We can define the coefficient of respending for an economy, call it r, as the response of these induced expenditures to changes in production.

$$\text{(III-4)} \qquad r = \frac{\text{the change in induced expenditures}}{\text{the change in GNP}}$$

When induced expenditures rise, this causes further increase in production. The eventual result of this process is a multiple increase in production for any initial change. r is central to this multiplier process. When it changes, it affects the size of the economy's multiplier.

Because the size of r is important in determining the size of the multiplier, we need to examine it in more detail. For simplicity we will discuss an economy with no exports or imports. When production increases, income is generated which is distributed between households, businesses and governments. Each of these three tends to respend some parts of the extra income but the respending coefficients are not all the same. On a year-to-year basis, respending by households is the highest while respending by governments is the lowest, probably close to zero. Business respending occupies an intermediate position. The size of r, then, depends on two things: the income distribution coefficients and the respending coefficients. We can state this as:

(III-5) $r = h \cdot r_h + b \cdot r_b + g \cdot r_g$

where

h = the response of disposable income to changes in GNP.

r_h = the response of consumption to changes in disposable income (the MPC).

b = the response of business cash flow (depreciation allowances plus after-tax corporate profits) to changes in GNP.

r_b = the response of business fixed investment to changes in cash flow.

g = the response of government tax receipts (net of transfer payments) to changes in GNP.

r_g = the response of government expenditures to changes in tax receipts.

h, b, and g are related such that all newly generated income must be distributed between households, businesses, and government. Thus, h plus b plus g is equal to 1. r_h, r_b, and r_g reflect the spending behavior of the economy's three main sectors and we accept these three as given. h, b, and g, on the other hand, will change when tax rates are altered, State UI transfer payments are changed, or when business dividend wage, and employment policies change. Since r_h is bigger than r_b and r_g and since r_b is larger than r_g, structural changes that reduce h and b but increase g will lower the respending ratio, hence reducing the multiplier.

Automatic stabilizers reduce the size of r. An example is the Federal personal income tax. Because of it, h is smaller and g is larger than they otherwise would be. In a similar way, the Federal corporate profits tax reduces b while raising g. Both taxes redistribute income towards the sector with the lowest coefficient of respending, thus reducing r and the multiplier. Social insurance is also an automatic stabilizer. The presence of employer contributions slightly reduces b, while State UI transfers, employee contributions and self-employed contributions all reduce h and raise g. We can use the econometric model to estimate the extent of these stabilizing influences.

2. Social Insurance as an Automatic Stabilizer

Social insurance adds considerable stability to the U. S. economy. Removing all of the social insurance equations from the econometric model for the year 1965 caused the government expenditures multiplier to increase from 2.02 to 2.50. This effect on the multiplier is primarily because social insurance reduces the responsiveness of disposable income to changes in GNP. Social insurance reduces h in two different ways: First, unemployment compensation offsets, for most workers, part of the loss in income from being laid off. Secondly, when wages and salaries, and proprietors' incomes increase, part of the increase is taxed away in the form of employee and self-employed contributions for social insurance. Social insurance also slightly reduces b, the response of corporate cash flow to changes in GNP. Since most of employer contributions seem to be passed forward as higher prices (see the discussion concerning equation (III-1) in section A), they only reduce b by a very small amount. Thus if these influences of social insurance on h and b were not present, the impact multiplier in the economy would be 2.50 rather than 2.02.

Most of the stabilizing influence of social insurance is attributable to State UI transfer payments. When its equation was removed from the econometric model, the multiplier rose from 2.02 to 2.38. When the contributions equations were removed, the multiplier only rose from 2.02 to 2.09. In relative terms contributions, by employers, employees and the self-employed, are about twenty percent $(\frac{2.09-2.02}{2.38-2.02} = \frac{.07}{.36})$ as strong as State UI transfers as an automatic stabilizer. Since contributions rates for OASDHI have been growing and will continue to grow, however, the importance of contributions as an automatic stabilizer is going to increase.

To help gain more perspective on the role of social insurance as an automatic stabilizer, it is instructive to compare it with the Federal personal income tax. In 1965, the income tax equation in the model had marginal tax rates of .18 on the taxable parts of personal income. When this equation was suppressed the impact multiplier increased from 2.02 to 2.69. Since the increase when social insurance was suppressed was 2.02 to 2.50, we conclude that social insurance is about seven-tenths as strong as the Federal personal tax income tax as an automatic stabilizer. Removing social insurance causes the multiplier to increase by .48 while removing the income tax raises it by .67.

3. The Stabilizing Impacts of Proposed Changes in State UI

Many proposals have been advanced to change the benefit features of the State UI system.[7] Three are: (i) to increase the size of average weekly benefits (to one-half or two-thirds of average weekly wages); (ii) to lengthen the maximum duration of benefits (to thirty-nine or fifty-two weeks); and (iii) to extend coverage to certain workers not currently covered by State UI. If these proposals were to be enacted into law, they would directly increase the economic security of wage and salary workers through the increased size and duration of weekly benefits. From our discussion of State UI as an automatic stabilizer, we can see that economic security would also be increased indirectly because the proposed changes would reduce the size of h, hence the multiplier. It is this latter effect which we will examine.

We noted in Chapter II that average weekly benefits are considerably less than one-half of average earnings because states have placed upper limits on the size of average weekly benefits. Removing these ceilings would cause weekly benefits to rise from their current size, roughly one-third of average weekly earnings, to one-half of average weekly earnings. If this happened, the multiplier would decrease from 2.02 to 1.90. Raising benefits to two-thirds of weekly earnings would further reduce it to 1.79.

Expanding the maximum duration of eligibility for benefits from twenty-six to thirty-nine would also reduce the multiplier. To estimate the size of this effect, we took the number of State UI exhaustees for each year between 1953 and 1966 and extended the average duration of their benefits from twenty-six weeks to an amount which averaged thirty-four weeks. The duration varied from year to year depending on economic conditions; it was longer in recession years and shorter in boom years. We then used this series of extra manweeks of benefits to construct a new series of the average number of State UI beneficiaries. The relation between this new series and total unemployment was:

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[7] For a full discussion of these proposed changes and the arguments for and against such changes, see William Haber and Merrill G. Murray, Unemployment Insurance in the American Economy, (Homewood, Illinois: Richard D. Irwin, Inc., 1966), particularly Chapters 10, 11, and 12.

$$\text{(III-6)} \qquad \Delta U^{39}_{B} = \underset{(.052)}{.826\Delta U} - \underset{(.065)}{.088\Delta^{2}CLF} - .030$$

$$R^2 = .96$$

$$\hat{\sigma}_U = .13$$

where

U^{39}_{B} = the average number of State UI beneficiaries when the maximum duration of benefits is 39 weeks.

U = total unemployment.

CLF = the civilian labor force.

Comparing (III-6) with (II-14) of Chapter II, we can see that the response of State UI beneficiaries to changes in unemployment rises from .604 to .826, when duration is extended to thirty-nine weeks. Replacing (II-14) by (III-6) in the econometric model caused the impact multiplier of government expenditures to fall from 2.02 to 1.90. Thus extending maximum duration from twenty-six to thirty-nine weeks would have as large a stabilizing impact as increasing average weekly benefits to one-half the size of average weekly earnings.

Increasing the coverage of State UI in the economy would also increase stability. Following the argument of Haber and Murray,[8] we feel it feasible to extend coverage to employees of small firms, non-profit organizations, State and local government employees, agricultural workers and domestic service workers. Extending coverage to agricultural and domestic service workers, it should be noted, would present administrative problems in obtaining wage records. Also, it would mean broadening the scope of State UI coverage to include people who normally do not work at full-time, all-year jobs. The high incidence of unemployment among agricultural workers and domestic workers makes it necessary to at least consider such an extension. Extending coverage would cause the number of State UI beneficiaries to change by larger amounts than at present for a given change in unemployment.

To approximate this increased responsiveness, we first compared changes in covered wage and salary employment with changes in total wage and salary employment. For 1958 to 1965 the observed relation was:

$$\text{(III-7)} \qquad \Delta E_w = \underset{(.050)}{1.116}\Delta E^{UI} - .054$$

$$\bar{R}^2 = .99$$

$$\hat{\sigma}_U = .14$$

where

E_w = total wage and salary employment, Bureau of Labor Statistics establishment series.

E^{UI} = employment covered by State UI.

We then multiplied the slope coefficient for changes in unemployment (equation (II-14) of Chapter II) of .604 times the slope coefficient in

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[8] *Ibid.*, p. 171.

(III-7), 1.116. The product of these two, .674, was then used as an estimate of how much more responsive State UI beneficiaries would be to changes in total unemployment if coverage were increased. Using this coefficient in the econometric model reduced the multiplier from 2.02 to 1.98. Thus of the three proposed changes in State UI, extending coverage would have the smallest stabilizing impact on the economy.

Large additions to economic stability would be realized if all of the proposed changes in State UI were enacted. Increasing benefits to half of weekly earnings, extending duration to thirty-nine weeks and increasing coverage would cause the multiplier to decrease from 2.02 to 1.74. If benefits were made two-thirds of weekly wages, this along with the other changes would further reduce the multiplier to 1.59. This reduction, 2.02 to 1.59, represents about twenty percent of the original size of the multiplier. Thus, in addition to large direct benefits to the economic security of workers, these changes in State UI would also yield a large indirect benefit, a twenty-percent reduction in the size of the impact multiplier in the economy.

4. The Stabilizing Impact of Employer Contributions for State UI

Having studied how State UI transfers adds stability to the economy and how increases in coverage, size and duration of benefits would further increase this stabilizing influence, it is next necessary to examine how the method of financing these transfer payments affects economic stability. Earlier (section A-2 of Chapter II), we examined the link between State UI transfers and the employer contributions rate. We noted that when transfers rise, this causes the employer contribution rate to rise in the following two years. Because this response of the contribution rate raises unit costs and then prices, the effect of the employer contribution rate is to reduce real disposable income, partially offsetting the stabilizing impact of the transfer payments.

Although the response of the employer contribution rate tends partly to offset the stabilizing influence of State UI transfers, the size of this effect is quite small. We estimated this effect by comparing three long-run multipliers generated by the econometric model. First, we increased real government expenditures in 1960 by $1 billion. The long-run, seven-period, multiplier of this increase was 3.06. That is, real GNP was $3.06 billion higher in 1966 as a result of this sustained increase in real government expenditures starting in 1960. Next, we suppressed the response of State UI transfers to changes in unemployment and again calculated a seven-period multiplier. This was 4.00. Finally the multiplier when there was a response of transfers but a fixed employer contribution rate was 2.72. We thus conclude that the response of the employer contributions rate reduces by about one-fourth $(\frac{3.06-2.72}{4.00-2.72} = \frac{.34}{1.28} = .27)$ the long-run effectiveness of State UI transfers as an automatic stabilizer. The long-run multiplier of government expenditures would be 2.72 rather than 3.06 if there were no response of the contribution rate to changes in transfers.

This finding has one important implication. It means that the current operation of the State UI system lends a strong stabilizing influence to aggregate demand. Thus changes in the system that would increase the response of transfer payments to changes in GNP such as we examined in part C-3 of this Chapter would further increase this stabilizing influence. This conclusion holds even though the proposed

changes would increase the year-to-year fluctuations in transfer payments hence increasing the fluctuations in the employer contribution rate for State UI.

APPENDIX A--GLOSSARY OF SYMBOLS

The symbols which appear in Chapters II and III are listed below along with their definitions. They are in order of first appearance.

Chapter II

TF^{OA} = the size at the end of the year of all trust funds associated with OASDHI. Before 1956 this is the old-age and survivors insurance trust fund. For years since 1956 the disability insurance trust fund is also included.

SI_{rp}^{OA} = private employer contributions for OASDHI.

SI_{ro}^{OA} = State and local government and Army contributions for OASDHI.

SI_{e}^{OA} = employee contributions for OASDHI.

SI_{se}^{OA} = self-employed contributions for OASDHI.

X^{OA} = total OASDHI transfer payments.

IY^{OA} = interest-income of the OASDHI trust funds.

Z^{OA} = administrative expenses of OASDHI

FI^{OA} = financial interchange between OASDHI and the Railroad retirement. account.

AMB^{OA} = average monthly OASDHI benefits.

O^{OA} = the number of monthly OASDHI beneficiaries.

W_{TX}^{OA} = taxable wages under OASDHI.

W_{c}^{OA} = wages covered by OASDHI.

E_{c}^{OA} = employment covered by OASDHI.

$\overline{W}_{TX}^{OA} = \frac{W_{TX}^{OA}}{E_{c}^{OA}}$ = average taxable wages under OASDHI.

$\overline{W}_{c}^{OA} = \frac{W_{c}^{OA}}{E_{c}^{OA}}$ = average covered wages under OASDHI.

TM = maximum taxable earnings per employee under OASDHI.

α' = contribution rate for OASDHI for self-employed persons.

β' = ratio of the taxable net income to total net income of self-employed persons covered by OASDHI.

γ' = ratio of net income covered by OASDHI to total net income of self-employed persons.

PY = net income of self-employed persons.

$\overline{py}_{TX}$ = average taxable net income of self-employed persons covered by OASDHI.

$\overline{py}_{c}$ = average net income of self-employed persons covered by OASDHI.

TF^{UI} = the size at the end of the year of State Unemployment Insurance trust fund.

SI_r^{UI} = employer contributions for State Unemployment Insurance.

IY^{UI} = interest income of the State Unemployment Insurance trust fund.

X^{UI} = Unemployment Insurance transfer payments.

AWB = average weekly State UI benefits.

U_B = the average number of weekly State UI beneficiaries (in millions).

U = unemployment.

CLF = the civilian labor force

α'' = the average contribution rate for employers covered by State UI.

β'' = the ratio of taxable to total wages and salaries paid by employers covered by State UI.

γ'' = the ratio of wages and salaries of employers covered by State UI to total wages and salaries in the private non-farm sector of the economy.

$\overline{W}_{TX}^{UI}$ = average taxable wages and salaries of workers covered by State UI.

$\overline{W}_c^{UI}$ = average wages and salaries of workers covered by State UI.

$\overline{TM}$ = average maximum wages per employee taxable under State UI

m_1 = markup of price over wages plus material costs for all manufacturing industries.

m_2 = markup of price over wages plus material costs plus supplements to wages for all manufacturing industries.

Div = corporate dividend payments, in billions of dollars.

CP_{at} = corporate profits after taxes, in billions of dollars.

$\overline{PE}$ = expenditures for nonresidential fixed investment, in billions of 1958 dollars.

$\overline{G}*$ = non-imputed privately produced, non-farm output, in billions of 1958 dollars.

$\overline{C}*$ = non-imputed private, non-farm productive capacity, in billions of 1958 dollars.

$\overline{CRE}$ = corporate retained earnings, in billions of 1958 dollars.

$\overline{CCA}$ = capital consumption allowances, in billions of 1958 dollars.

Chapter III

P* = the price deflator for private, non-farm GNP.

ULC = unit labor costs in the private, non-farm sector. This is employee compensation (wages and salaries plus other labor income plus employer contributions for social insurance) divided by real GNP.

CU = capacity utilization.

P_c = the consumer expenditures price deflator.

P_f = the farm GNP deflator.

CP = corporate profits plus the inventory valuation adjustment.

NI_{nf} = private, non-farm national income.

W = private, non-farm wages and salaries plus other labor income.

SI_r^p = private employer contributions for social insurance.

r = coefficient of respending = the change in induced expenditures divided by the change in GNP.

h = the response of disposable income to changes in GNP.

r_h = the response of consumption to changes in disposable income (the MPC).

b = the response of business cash flow (depreciation allowances plus after-tax corporate profits) to changes in GNP.

r_b = the response of business fixed investment to changes in cash flow.

g = the response of government tax receipts (net of transfer payments) to changes in GNP.

r_g = the response of government expenditures to changes in tax receipts.

U_B^{39} = the average number of State UI beneficiaries when the maximum duration of benefits is thirty-nine weeks.

U = total unemployment.

CLF = the civilian labor force.

E_w = total wage and salary employment, Bureau of Labor Statistics establishment series.

E^{UI} = employment covered by State UI.

APPENDIX B

Data: Determinants of Contributions and Transfer Payments under OASDHI and State UI.

TABLE B-1

OASDHI - TRANSFER PAYMENTS, EMPLOYER, AND EMPLOYEE CONTRIBUTIONS, 1950 - 1965

					Private Non-Farm Wage and Salary Workers						
Year	AMB^{OA} (1)	O^{OA} (2)	α (3)	β (4)	γ (5)	W_{TX}^{OA} (6)	W_{c}^{OA} (7)	W^{P} (8)	E_{c}^{OA} (9)	$\overline{W}_{TX}^{OA}$ (10)	$\overline{W}_{c}^{OA}$ (11)
1950	26.39	3.01	.015	.797	.903	87.50	109.80	121.62	35.63	2.456	3.081
1951	38.58	4.04	.015	.841	.936	109.65	130.36	139.31	38.39	2.856	3.396
1952	38.83	4.67	.015	.829	.944	116.72	140.82	149.23	38.76	3.011	3.633
1953	44.52	5.58	.015	.807	.946	123.43	152.91	161.62	39.71	3.108	3.851
1954	46.71	6.48	.02	.796	.950	120.65	151.56	159.50	38.57	3.128	3.929
1955	54.32	7.54	.02	.827	.950	135.68	164.08	172.72	40.54	3.347	4.047
1956	55.59	8.47	.02	.811	.943	143.15	176.52	187.20	42.04	3.405	4.199
1957	58.77	10.38	.0225	.794	.948	147.51	185.70	195.81	41.91	3.520	4.431
1958	59.59	11.86	.0225	.780	.953	144.13	184.72	193.83	41.06	3.510	4.499
1959	64.24	13.20	.025	.812	.958	163.38	201.09	209.95	42.55	3.840	4.726
1960	64.87	14.30	.030	.796	.958	167.38	210.26	219.43	43.32	3.864	4.854
1961	66.87	15.72	.030	.789	.955	168.15	213.16	223.14	43.51	3.865	4.899
1962	68.58	17.37	.03125	.773	.960	176.13	227.89	237.38	44.62	3.947	5.107
1963	68.14	18.64	.03625	.760	.959	181.39	238.73	248.84	45.48	3.988	5.249
1964	68.22	19.57	.03625	.743	.958	189.81	255.31	266.63	46.81	4.055	5.454
1965	74.34	20.25	.03625	.742	.958	203.60	274.47	286.45	48.66	4.184	5.639

TABLE B-2

OASDHI - TAXABLE MAXIMUM AND SELF-EMPLOYED CONTRIBUTIONS, 1950 - 1965

	Private Non-Farm Self-Employed Persons									
Year	TM (12)	α' (13)	β' (14)	γ' (15)	PY_{TX}^{OA} (16)	PY_{c}^{OA} (17)	PY (18)	E'_c (19)	$\overline{PY}_{TX}^{OA}$ (20)	$\overline{PY}_{c}^{OA}$ (21)
1950	3.0									
1951	3.6	.0225	.579	.629	9.52	16.42	26.12	4.19	2.269	3.917
1952	3.6	.0225	.596	.604	9.76	16.38	27.12	4.24	2.301	3.863
1953	3.6	.0225	.588	.621	10.03	17.05	27.46	4.34	2.310	3.927
1954	3.6	.03	.600	.611	10.11	16.84	27.56	4.35	2.325	3.873
1955	4.2	.03	.627	.624	11.85	18.90	30.28	4.46	2.659	4.244
1956	4.2	.03	.667	.624	13.04	19.56	31.34	4.82	2.704	4.056
1957	4.2	.03375	.631	.624	12.91	20.46	32.78	4.72	2.735	4.344
1958	4.2	.03375	.620	.624	12.85	20.71	33.17	4.72	2.725	4.391
1959	4.8	.0375	.652	.624	14.30	21.93	35.12	4.82	2.968	4.553
1960	4.8	.045	.658	.624	14.07	21.38	34.24	4.71	2.984	4.535
1961	4.8	.045	.639	.624	14.19	22.22	35.59	4.66	3.045	4.766
1962	4.8	.047	.619	.624	14.31	23.16	37.09	4.67	3.067	4.964
1963	4.8	.054	.604	.624	14.30	23.67	37.91	4.67	3.062	5.068
1964	4.8	.054	.586	.624	14.58	24.90	39.88	4.66	3.129	5.343
1965	4.8	.054	.596	.624	15.13	25.38	40.65	4.74	3.192	5.354

TABLE B-3

STATE UI - TRANSFER PAYMENTS AND CONTRIBUTIONS, 1950 - 1965

Year	AWB (22)	U_B (23)	α'' (24)	β'' (25)	γ'' (26)	W^{UI}_{TX} (27)	W^{UI}_{c} (28)	W^{P} (8)	E^{UI}_{c} (29)	$\bar{W}^{UI}_{TX}$ (30)	$\bar{W}^{UI}_{c}$ (31)	$\overline{TM}$ (32)
1950	20.76	1.30	.0149	.791	.848	81.54	103.13	121.62	32.89	2.480	3.136	3.000
1951	21.09	.80	.0158	.760	.852	90.25	118.72	139.31	34.86	2.589	3.406	3.000
1952	22.79	.88	.0145	.741	.856	94.67	127.81	149.23	35.58	2.661	3.593	3.000
1953	23.58	.82	.0130	.716	.861	99.63	139.15	161.62	36.67	2.717	3.795	3.000
1954	24.93	1.61	.0112	.704	.859	96.54	137.07	159.50	35.37	2.729	3.875	3.001
1955	25.04	1.08	.0118	.683	.861	101.58	148.64	172.72	36.59	2.776	4.062	3.003
1956	27.02	1.02	.0132	.668	.879	109.82	164.51	187.20	38.98	2.817	4.220	3.012
1957	28.17	1.23	.0131	.650	.887	112.83	173.63	195.81	39.67	2.844	4.377	3.014
1958	30.54	2.22	.0132	.636	.885	109.14	171.46	193.83	38.09	2.865	4.501	3.014
1959	30.40	1.46	.0171	.617	.890	115.27	186.80	209.95	39.52	2.917	4.727	3.014
1960	32.87	1.64	.0188	.611	.889	119.26	194.97	219.43	40.17	2.969	4.854	3.083
1961	33.80	2.00	.0206	.600	.891	119.37	198.82	223.14	40.02	2.983	4.968	3.087
1962	34.56	1.53	.0236	.590	.895	125.50	212.37	237.38	41.23	3.044	5.151	3.133
1963	35.28	1.54	.0231	.581	.895	129.59	222.78	248.84	41.96	3.088	5.309	3.164
1964	35.96	1.37	.0221	.570	.896	136.33	238.95	266.63	43.14	3.160	5.539	3.211
1965	37.19	1.13	.0212	.559	.900	144.03	257.69	286.45	45.05	3.197	5.720	3.217

Definitions, Derivations, and Sources

(1) AMB^{OA} - Average monthly benefits of all OASDHI beneficiaries. Source: Average monthly benefits for each year was derived by dividing total OASDHI transfer payments by the average monthly number of OASDHI beneficiaries.

(2) O^{OA} - Average monthly number of OASDHI beneficiaries (in millions). Source: U. S. Social Security Administration, Social Security Bulletin, Annual Statistical Supplement, 1965 (Washington: U. S. Government Printing Office, 1967), Table 7.

(3) α = Employer and employee contribution rate for OASDHI. Source: Ibid., Table 19.

(4) $\beta = \frac{W^{OA}_{TX}}{W^{OA}_{c}}$ - Ratio of taxable wages and salaries to total wages and salaries covered by OASDHI in the private, non-farm sector of the U. S. economy.

(5) $\gamma = \frac{W^{OA}_{c}}{W^{P}}$ - Ratio of wages and salaries covered by OASDHI to total wages and salaries in the private, non-farm sector of the U. S. economy.

(6) W^{OA}_{TX} - Wages and salaries taxable under OASDHI in the private, non-farm sector of the U. S. economy (in billions of dollars). Source: (a) For 1950-1963, U. S. Social Security Administration, Quarterly Summary of Employment, Earnings and Benefit Data, XXI (Washington: U. S. Government Printing Office, September, 1965) Table 10; (b) For 1964-1965, U. S. Social Security Administration, Social Security Bulletin, XXIX (December, 1966) Table Q3.

These sources give taxable wages and salaries for the non-farm sector of the economy. Taxable wages and salaries of state and local government employees and members of the armed forces were removed from this figure to yield private, non-farm wages and salaries taxable under OASDHI. Taxable wages and salaries of state and local government employees and members of the armed forces are estimated each year from contributions data given in: U. S. Social Security Administration, Social Security Bulletin, Annual Statistical Supplement, op. cit., Table 35.

(7) W_c^{OA} - Wages and salaries covered by OASDHI in the private non-farm sector of the U. S. economy (in billions of dollars). Source: Same as for taxable wages and salaries. Covered wages of state and local government employees were estimated by assuming β for these persons was the same as for private wage and salary employees and then dividing taxable wages by β. Covered wages of members of the armed forces were estimated by assuming $\beta = .93$ and then dividing taxable wages by .93.

(8) W^P - Wages and salaries in the private non-farm sector of the U. S. economy (in billions of dollars). Source: U. S. Department of Commerce, The National Income and Product Accounts of the United States, 1929-1965 Statistical Tables (Washington: U. S. Government Printing Office, 1967), Table 6.2, line 87 less line 3.

(9) E_c^{OA} - Wage and salary employees covered by OASDHI in the private, non-farm sector of the U. S. economy (in millions of dollars). Source: Averages based on the calendar week in the months of March, June, September and December when Current Population Survey

was taken. Except for 1950, all data was supplied to the author by the Social Security Administration. 1950 employment was estimated by the author.

(10) $\bar{W}_{TX} = \frac{W^{OA}_{TX}}{E^{OA}_{c}}$ - Average taxable wages of private, non-farm employees covered by OASDHI (in thousands of dollars).

(11) $\bar{W}_{c} = \frac{W^{OA}_{c}}{E^{OA}_{c}}$ - Average wages of private, non-farm employees covered by OASDHI (in thousands of dollars).

(12) TM = Maximum taxable earnings of a person covered by OASDHI (in thousands of dollars). Source: U. S. Social Security Administration, Social Security Bulletin, Annual Statistical Supplement, 1965, op. cit., Table 19.

(13) α' - Contribution rate for self-employed persons. Source: Ibid.

(14) $\beta' = \frac{PY^{OA}_{TX}}{PY^{OA}_{c}}$ - Ratio of taxable net income to total net income of non-farm self-employed persons.

(15) $\gamma' = \frac{PY^{OA}_{c}}{PY_{NF}}$ - Ratio of net income covered by OASDHI to total net income of non-farm employed persons.

(16) PY^{OA}_{TX} - Taxable net income of non-farm self-employed persons under OASDHI (in billions of dollars). Source: Ibid., Tables 23 and 24.

(17) PY^{OA}_{c} - Net income of non-farm self-employed persons covered by OASDHI (in billions of dollars). Source: For 1951-1954 Ibid., Table 23; For 1955-1965 covered net income was estimated to be 62.427 percent of total net income of non-farm self-employed persons.

This percentage figure was estimated from the long-run ratio of covered to total net income of self-employed persons.

(18) PY - Net income of non-farm self-employed persons (in billions of dollars). Source: U. S. Department of Commerce, The National Income and Product Accounts of the United States, 1929-1965 Statistical Tables, op. cit., Table 2.1, line 10.

(19) E'_c - Non-farm self-employed persons covered by OASDHI (in millions). Source: U. S. Social Security Administration, Social Security Bulletin, Annual Statistical Supplement, 1965, op. cit., Tables 23 and 24.

(20) $\overline{py}^{OA}_{TX} = \frac{PY^{OA}_{TX}}{E'_c}$ - Average taxable net income of non-farm, self-employed persons covered by OASDHI (in thousands of dollars).

(21) $\overline{py}^{OA} = \frac{PY^{OA}_c}{E'_c}$ - Average net income of non-farm, self-employed persons covered by OASDHI (in thousands of dollars).

(22) AWB - Average weekly benefits of State UI beneficiaries. Source: for 1950-1953, U. S. Bureau of Employment Security, Handbook of Unemployment Insurance Financial Data, 1946-1963 (Washington: U. S. Government Printing Office, 1966), pp. 1-22; For 1954-1965, U. S. Bureau of Employment Security, Unemployment Insurance Review, III (March, 1966), p. 23.

(23) U_B - State UI beneficiaries, annual average. Source: Same as for AWB.

(24) α'' - Average contribution rate for private employers covered by State UI. Source: U. S. Bureau of Employment Security, Unemployment Insurance Review, III (July, 1966), p. 1.

(25) $\beta'' = \frac{W_{TX}^{UI}}{W_c^{UI}}$ - Ratio of taxable wages and salaries to total wages and salaries of private non-farm employers covered by State UI.

(26) $\gamma'' = \frac{W_c^{UI}}{W^P}$ - Ratio of wages and salaries covered by State UI to total wages and salaries in the private, non-farm sector of the economy.

(27) W_{TX}^{UI} - Taxable private non-farm wages and salaries under State UI. Source: For 1950-1962, U. S. Bureau of Employment Security, Handbook of Unemployment Insurance Financial Data, op. cit., pp. 1-50; For 1963-1964, U. S. Bureau of Employment Security, Unemployment Insurance Review, III (March, 1966) p. 22. For 1965, estimated by author by dividing collections by the average employer contribution rate.

(28) W_c^{UI} - Private, non-farm wages and salaries in industries covered by State UI (in billions of dollars). Source: U. S. Bureau of Employment Security, Employment and Wages (December, 1966) Table 2B.

(29) E_c^{UI} - Private, non-farm employment covered by State UI (in millions). Source: Ibid.

(30) $\bar{W}_{TX}^{UI} = \frac{W_{TX}^{UI}}{E_c^{UI}}$ - Average taxable wages of persons covered by State UI (in thousands of dollars).

(31) $\bar{W}_c^{UI} = \frac{W_c^{UI}}{E_c^{UI}}$ - Average wages of persons covered by State UI (in thousands of dollars).

(32) $\overline{TM}$ - Average maximum taxable wages of persons covered by State UI (in thousands of dollars). This is a weighted average of the taxable maximums for the different states. The weights are each state's relative share of personal income for the year in question. Source: For 1950-1963 the taxable maximums for the different states in each year appear in U. S. Bureau of Employment Security, Handbook of Unemployment Insurance Financial Data, 1946-1963, op. cit., pp. 1-130. For 1964 and 1965, they appear in: U. S. Bureau of Employment Security, Unemployment Insurance Review, III (November-December, 1966), p.2.

APPENDIX C

Data: Manufacturing Markups, 1952-1965.

TABLE C-1

MANUFACTURING SALES AND COST DATA: 1952-1965
(All figures are in billions of dollars)

Year	1 Sales (1)	2 Manufacturing GNP (2)	3 Cost of Purchased Mat'l & Serv. (3)	4 Wages & Salaries (4)	5 Wages (5)	6 Supplements to Wages & Salaries (6)	7 Supplements to Wages (7)	8 Markup Over Wages Plus Mat'l. (8)	9 Markup Over Wages Plus Mat'l. Plus Supplements to Wages (9)
1952	256.1	102.9	153.2	62.4	43.8	4.5	3.1	1.300	1.280
1953	275.5	112.0	163.5	71.2	49.0	5.0	3.4	1.296	1.276
1954	264.9	106.2	158.7	67.6	44.6	5.2	3.4	1.303	1.282
1955	302.2	120.8	181.4	73.9	49.2	6.0	4.0	1.310	1.288
1956	314.8	126.8	188.0	79.5	52.1	6.9	4.4	1.311	1.288
1957	329.4	131.4	198.0	82.5	52.6	7.6	4.8	1.314	1.290
1958	321.9	123.7	198.2	78.7	49.6	7.6	4.7	1.299	1.275
1959	357.7	141.1	216.6	86.9	54.7	8.9	5.6	1.318	1.292
1960	364.6	144.0	220.2	89.7	55.5	9.7	6.1	1.322	1.294
1961	369.9	144.2	225.7	89.8	54.7	9.9	6.1	1.319	1.291
1962	399.7	158.8	240.9	96.7	59.1	11.5	7.1	1.332	1.302
1963	419.3	167.0	252.3	100.6	61.9	12.3	7.6	1.335	1.303
1964	453.7	179.8	273.9	107.2	65.8	13.3	8.2	1.336	1.304
1965	502.7	196.7	306.0	115.5	71.1	14.6	9.0	1.333	1.302

Definitions, Derivations, and Sources

These sales and cost data were used to compute the manufacturing markups shown in Figure II-5. The two markups appear in columns (8) and (9) of Table C-1.

(1) Corporate sales in manufacturing. Source: U. S. Department of Commerce, The National Income and Product Accounts of the United States, 1929-1965 Statistical Tables (Washington: U. S. Government Printing Office, 1967), Table 6.19.

(2) Manufacturing GNP. Source: U. S. Department of Commerce, Survey of Current Business, XXXXVII, (April, 1967), p. 21.

(3) Cost of purchased materials and services in manufacturing. Source: Corporate Sales less Manufacturing GNP (Column 1 less column 2).

(4) Manufacturing wages and salaries. Source: U. S. Department of Commerce, The National Income and Product Accounts, ..., op. cit., Table 6.2.

(5) Manufacturing wages. Source: U. S. Department of Commerce, Annual Survey of Manufacturers (Washington: U. S. Government Printing Office, 1965), Table 2.

(6) Supplements to manufacturing wages and salaries. Source: U. S. Department of Commerce, The National Income and Product Accounts, ..., op. cit., Table 6.7.

(7) Supplements to wages in manufacturing. Source: Supplements to wages and salaries in manufacturing times the ratio of wages to wages plus salaries (column (6) times column (5) divided by column (4)).

(8) m_1 - Markup of price over wages plus materials costs. Source: Corporate manufacturing sales divided by the sum of wages plus material costs (column (1) divided by the sum of columns (3) plus (5)).

(9) m_2 - Markup of price over wages plus material costs plus supplement to wages. Source: Corporate manufacturing sales divided by the sum of wages plus material costs plus supplements to wages (column (1) divided by the sum of columns (3) plus (5) plus (7)).

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